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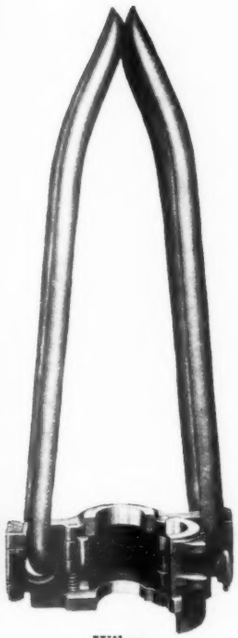

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California Watched by Oil Industry

Highest daily average estimated production in 1926, week ended Dec. 25, 2,385,139 bbls. Lowest in 1926, January 30, 1,915,960 bbls.

Developments There Point to a High Level of Production, With Substantial Increases in the Output of Light Oil

By Andrew M. Rowley

Highest daily average estimated light oil production in 1926, week ended Dec. 25, 1,797,349 bbls. Lowest in 1926, Jan. 30, 1,371,600 bbls.

California probably is being watched as closely by the petroleum industry as is West Texas, owing to developments there which point to a high level of production, with substantial increases in the yield of light oil, especially in the Long Beach Field. Long Beach, which had an estimated daily average production last week of 108,000 barrels, is expected to attain a daily output of 200,000 barrels by the middle of next summer. Besides this, there are other areas in the State which give promise of adding sufficient new production to offset at least natural declines in older fields.

In addition to the increased production expected from the Pacific Coast, it is believed Venezuela will wield a greater influence on the general situation next year by reason of the fact shipments of crude from that country to the United States probably will register a marked gain. Developments in Venezuela were curtailed during the past year because of the flood of oil coming from the Greater Seminole area in Oklahoma. With Seminole on the decline, it is believed eastern refiners will draw more and more on the output of the Venezuela fields.

The decline which has started in definitely at Seminole, will help the situation in the Mid-Continent area, if a drilling campaign is not started in other parts of the Seminole Field where tests already drilled indicate new pools are located. It is agreed such a campaign shall not be started until January 1 at least, but it would aid matters if that agreement among the operators were continued until there is a greater demand for the oil.

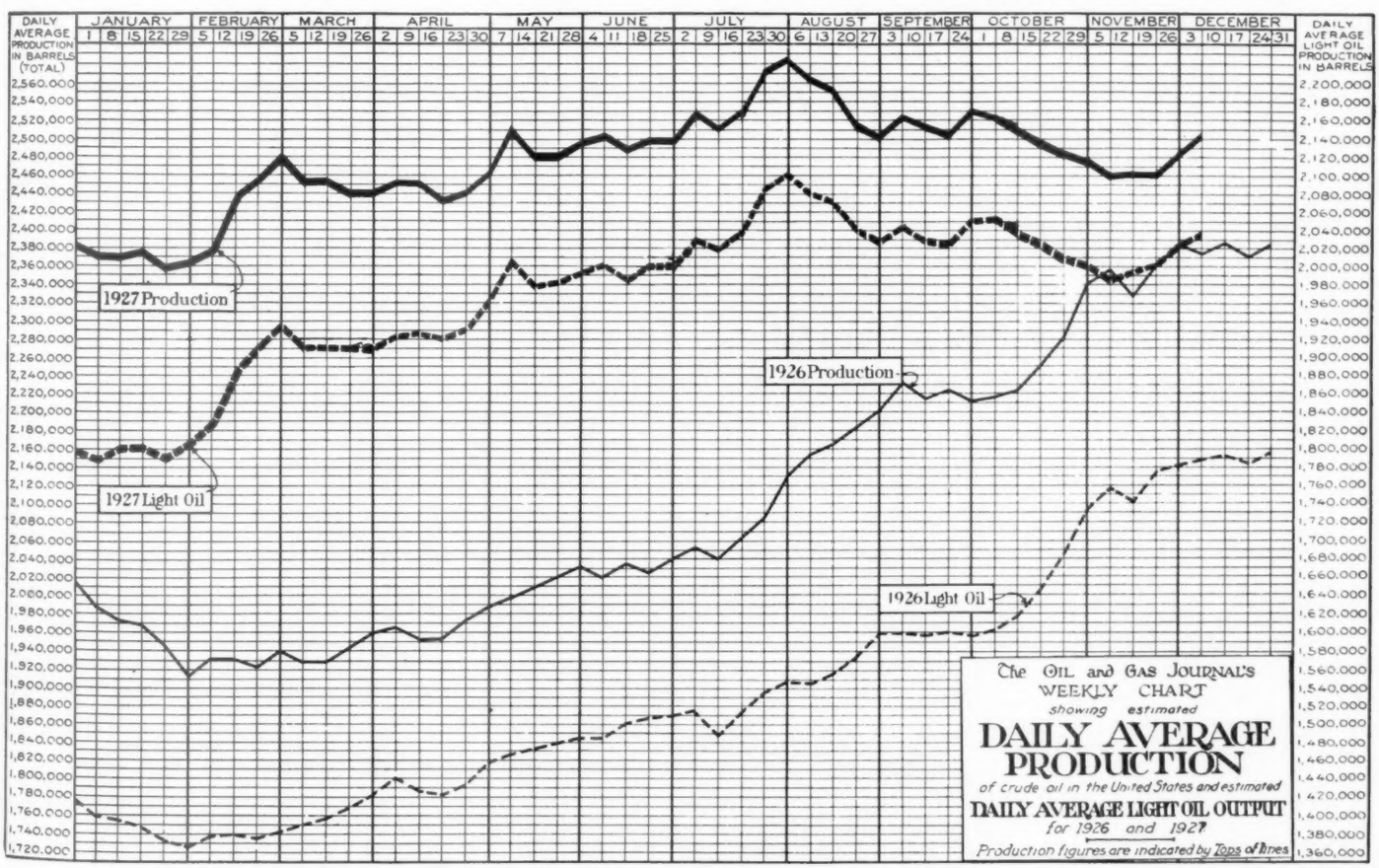
The increase in price posted for Pennsylvania oil has no significance in the general situation except that it indicates there is an increased demand for good lubricating stock. The price structure in the Mid-Continent depends to a large extent on what is done at Seminole. The situation will be strengthened if new areas there are not developed until production shows a greater decline.

PRODUCTION IN THE UNITED STATES

Estimated daily average production of light and heavy gravity oil in the United States for week ended December 3 and a comparison with the previous week follows:

	Dec. 3		Nov. 26	
Oklahoma—	Light	Heavy	Light	Heavy
Tonkawa	16,415	.....	16,560	.....
Burbank	37,225	.....	37,835	.....
Other Osage Fields	30,040	.....	30,405	.....
Cushing and Shamrock	20,950	.....	21,245	.....
Bristow and Eastern Bristow	24,820	.....	24,830	.....
Cromwell	10,815	.....	10,985	.....
Garber	9,875	.....	9,910	.....
Blackwell-Braman	8,880	.....	8,960	.....
Seminole	424,235	.....	431,410	.....
Wewoka	10,295	.....	10,855	.....
Northern Miscellaneous	111,420	.....	110,345	.....
Southern Fields	61,045	.....	61,120	.....
Total Oklahoma	766,015	.....	774,460	.....
North Louisiana	38,995	9,015	40,090	9,050
Arkansas	23,000	73,670	23,240	73,570
North Central Texas	139,528	.....	140,961	.....
West Texas	249,001	.....	232,489	.....
Texas Panhandle	86,225	.....	81,695	.....
East Central Texas	28,645	.....	28,991	.....
Kansas	106,285	.....	106,210	.....
Total Mid-Continent Area	1,437,694	82,685	1,428,136	82,620
Gulf Coast	.....	141,356	.....	137,356
Southwest Texas	.....	28,374	.....	28,343
Eastern	114,000	.....	114,500	.....
Rocky Mountain Area	79,518	.....	78,163	.....
California—				
Santa Fe Springs	39,000	.....	39,000	.....
Long Beach	108,000	.....	105,500	.....
Torrance	3,000	17,000	3,000	17,000
Huntington Beach	60,500	.....	60,000	.....
Dominguez	14,000	.....	14,500	.....
Rosecrans	9,500	.....	9,000	.....
Inglewood	20,000	12,000	20,000	12,000
Ventura Avenue	53,000	.....	51,500	.....
Seal Beach	47,000	.....	48,000	.....
Remainder of State	55,000	186,000	55,000	185,500
Total California	409,000	215,000	405,500	214,500
Total United States	2,040,212	467,415	2,026,299	462,819
Grand Total	2,507,627		2,489,118	

→ **Total Increase, 18,509 Bbls.; Light Oil Increase, 13,913 Bbls.** ←



No Improvement in Oklahoma Market

Domestic Grades of Refinery and Natural Gasolines Weaker. Kerosene Prices Lower. Fuel Oils Sluggish

By W. T. Ziegenhain

The general Oklahoma market continued to be discouraging to the sellers. Export buying of the low endpoint gasolines served to relieve the gasoline market but there was considerable U. S. Motor gasoline sold below last week's prices. Natural gasolines developed added weakness over the week and all grades were selling at lower prices. The continued increase in the production of natural gasoline both as the result of the cooler weather and increased number of plants has been more than the ready market could absorb. Except for the few export purchases from time to time there has been plenty material available for several weeks in the past.

Kerosene developed additional weakness and the only support given the general market was talk of new export inquiries. These failed to develop into sales up to Tuesday.

There was a sharp distinction in price and spot demand for the low and high cold test fuels, especially in the lighter grades, but the entire fuel market continued heavy. The sale of a large quantity of 16-gravity fuel to a railroad at a price 5 cents above the low of the market for that grade, removed any thought of a further decline in prices for the time being at least, even though competition from the Panhandle and North Texas is reflected in the Oklahoma market.

The mild weather has been responsible for the slow movement of distillates and furnace oils and the market was very quiet. The jobbers are said to be supplying a greater portion of their trade from stocks and refiners do not expect any material increase in sales until more severe weather. The light gas oils having a low flash and transparent color were in fair demand as furnace oils but this demand was small compared to that for the 38-40 gravity-treated water white grade.

The lubricating oils, as a class remained unchanged but there was a decided weakness evidenced in bright stock, and light neutrals. Quotations varied widely and tests on the materials showed there was an equally wide range in quality even though sold under the same specifications.

The slow movement of wax on the export market and the decline in the price in the East has cast a pessimistic outlook on the immediate future for this commodity. Over the last four months, wax prices gradually increased until refiners were confident a price of 3 cents would be reached by this time. Some placed a portion of their production in storage, awaiting the better prices.

Crude Oil Situation

Earlier in the year refiners were confident conditions in the refined oil market would improve as the year closed and pointed to the high Seminole crude production as the dominating factor in the low refined oil market. The Seminole production has fallen off more than 100,000 bbls. since establishing its peak a little over four months ago. Since then there has been no improvement in the refined oil market and prices as a whole are somewhat lower. This can be accounted for from the standpoint of

(Continued on Page 139)

REFINED MARKET BAROMETER

The continued high consumption of gasoline in all sections of the country has been the principal factor in stabilizing gasoline prices. There are predictions of slightly higher prices for the Atlantic states but this can not be applied to the Mid-Continent and the California refining centers. In fact, added weakness developed in the Mid-Continent over the week, the only support given the gasoline market being in the export movement of the lower endpoint grades. Kerosene and distillates were generally weak. Further weakness in the natural gasoline market both in the Mid-Continent and in California resulted from the increased production in these territories. Fuel oil and gas oil continued weak as refiners found a limited market for their large production and stocks. Lubricants continued to move slowly with conditions along the Gulf Coast slightly improved. Bright stocks were the weakest commodity in the lubricant market. Wax prices were generally lower as consumption failed to equal production

Mid-Continent—Export purchases of the low endpoint grades of gasoline supported the general market but quotations on the U. S. Motor grade were lower in many cases. Kerosene was inactive and prices were generally slightly lower. Distillates and furnace oil demands were disappointing as jobbers sold from stocks and warm weather delay increased consumption. Fuels remained very weak. The balance of the products are unchanged.

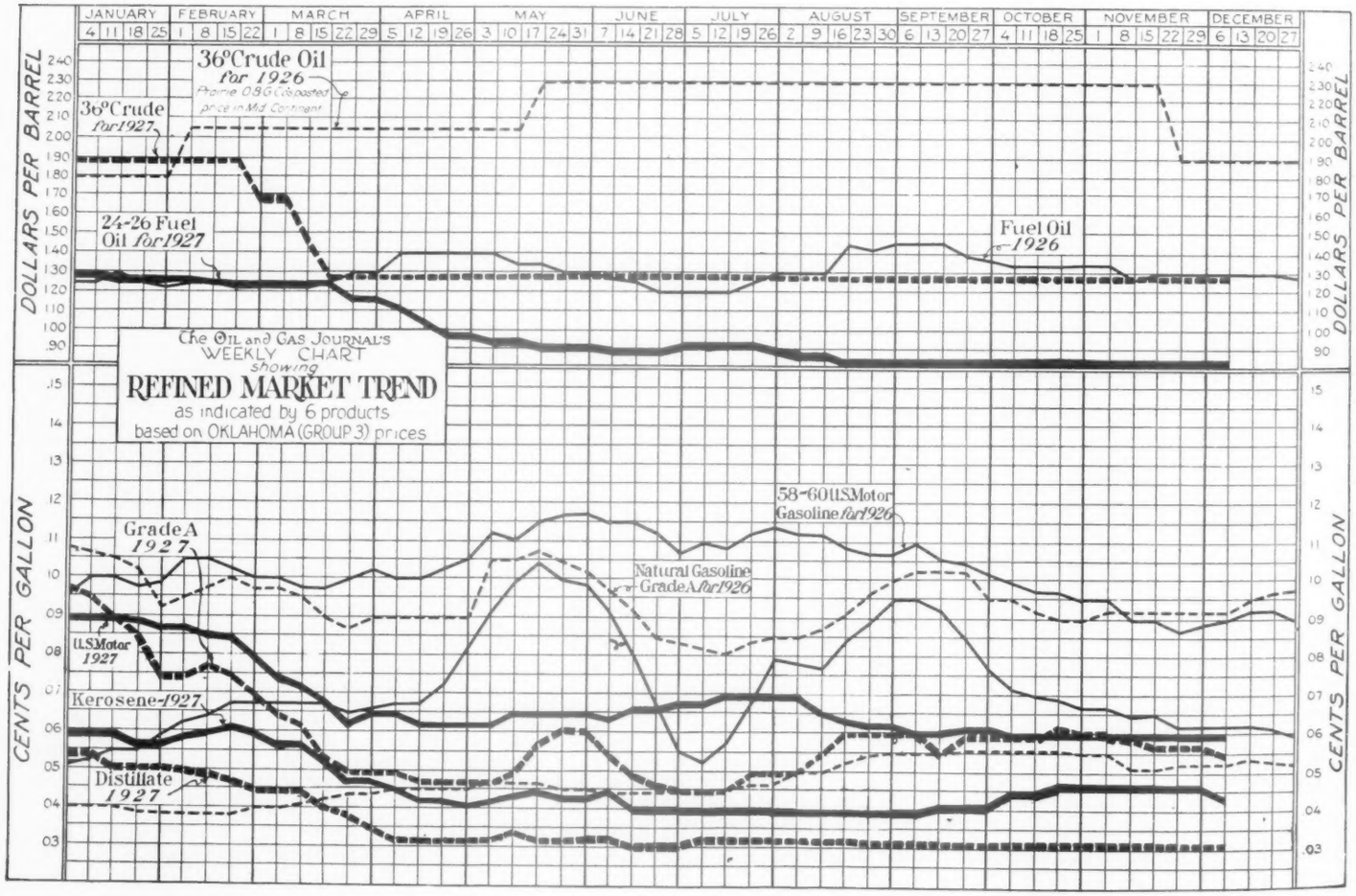
Atlantic Seaboard—Bunker fuel oil prices were further reduced as a result of the increased imports of West Texas crude and the abnormally low tanker rates. Gasoline consumption continued high. Kerosene remained firm despite the limited demand. Diesel oil continued strong. Industrial lubricants moved well but the balance of the lub market was quiet. Wax developed added weakness as exports and domestic consumption failed to absorb the production.

Pennsylvania—The high consumption of gasoline stabilized that market as other products remained unchanged.

Chicago—High gravity gasolines moved fairly well but there was no indication of higher prices for the immediate future. Additional inquiries for furnace oil appeared over the latter part of the week but the demand thus far has been discouraging.

California—Gasoline consumption continued high but there was plenty material available. The added production of natural gasoline has weakened that market and prices were generally lower. Fuel oil exports increased and strengthened that market, but most of this material was being moved to Pacific points, the shipments to the Atlantic Seaboard having decreased materially.

Gulf Coast—The high viscosity pale lubes were firm but very low prices were posted on the lower viscosity pale oils and red oils as the latter were freely offered throughout the normal Group 3 marketing territory.



Institute Adopts Active Platform

Beaty Committee Reports Proposed State and Federal Legislation Legalizing Co-operation. Doherty Pledges Support

By Andrew M. Rowley

CHICAGO, Dec. 7.—Co-operation, conservation and the elimination of waste was the keynote of the eighth annual convention of the American Petroleum Institute here this week. Realizing the importance of this meeting, assembling as it did at the time Congress took up its duties, leaders of the industry called a moratorium on other business and gathered here to lend their assistance to efforts being made to solve the vexing problems confronting the entire petroleum industry. As a result, probably close to 3,000 oil men (the greatest attendance in the history of the institute) met to exchange views and give of their experience to matters pertaining to the entire industry and public welfare.

The institute went on record as approving a co-operative research program intended to develop new uses for petroleum with a wider market for products, as giving moral support to the oil heating institute in its effort to provide the public with a combination of satisfactory oil burner and oil fuel, and in recommending to the Federal Oil Conservation Board the type of legislation best calculated to aid the states and national government in efforts to conserve petroleum.

Gas Conservation Report

The report of the Marland committee appointed in pursuance of the conclusion of the Federal Oil Conservation Board that "the prevention of waste of gas incident to the production of oil is of paramount importance in the conservation and economic production of oil," marked probably the most radically forward step ever presented to the directors.

The report recommended that the institute, in carrying out this new program, should encourage the passage of necessary state legislation to permit the co-operative development of oil pools where there is diversified ownership of lands and where such co-operative development is necessary in the interest of the protection of the correlative rights of owners and in the interest of economical production and conservation of oil.

Research in New Uses

The resolution pertaining to the co-operative research program intended to enlarge the market for petroleum products was presented to the directors by D. E. Buchanan, vice president, Chestnut & Smith, Corp., and, as adopted by the directors, follows:

"Be it resolved, that this board go on record as recognizing the apparent need and desirability of more diversified application of petroleum and its products to the industrial and commercial life of the day and, in order that the subject may have thorough study, the president of this institute be asked to appoint a committee of not to exceed five men whose duty it shall be to investigate the matter from all angles and report to the executive committee at the earliest possible date. If in the judgment of the committee, collective applied scientific research should be undertaken by the industry as a whole then the committee will be expected to present to the executive committee a tentative outline of a plan for the organization and prosecution of such work."

Marland Committee Report

The report relating to prevention of waste of gas in the production of oil, commonly known as the Marland bill by reason of the fact E. W. Marland, president of the Marland Oil Co., is chairman of the committee appointed at the Tulsa convention of the institute last year, created the greatest discussion on the part of the directors at this convention. The report of that committee follows:

"Resolved, that we reiterate our opinion that the prevention of the waste of gas is of paramount importance in connection with the economical production and conservation of oil.

"Resolved, that we suggest to the board of directors of the American Petroleum Institute that appropriate resolutions should be passed by that board calling upon the industry to adopt every reasonable and practical means to effect the conservation of natural gas in oil-bearing formations in the interest of economies in production costs, increased ultimate recovery, and in the interest of conserving our supplies of petroleum to meet the demands of consumption, and to the end that proper recognition of the correlative rights of the landowners and lease owners in a given pool may be obtained.

"Resolved, that we suggest to the board of directors of the American Petroleum Institute that it, by appropriate resolutions, encourage the co-operative development of oil pools, wherever found with diversified ownership, as the best means of effecting the greatest economies in the production of oil and as the best means of conserving our petroleum resources, and that to this end the institute should now encourage the passage of necessary state legislation to permit the co-operative development of oil pools where there is diversified ownership of lands and where such co-operative development is necessary in the interest of the protection of the correlative rights of owners and in the interest of economical production and conservation of oil.

"Resolved, that we suggest to the board of directors of the American Petroleum Institute that it should impress upon its members in the several states where oil is being produced, the need for state legislation, or other state regulatory measures, to permit and require the producers of oil and gas in those states to adopt measures to prevent the waste of natural gas found in oil sands.

"Resolved, that this committee suggests that the technical subcommittee of their committee be continued independently, or as a committee by the appropriate institute division to continue the study of the subject of gas conservation, the efficient utilization of gas and the general technique of production; and that a legal committee, composed of the present members of this committee's legal subcommittee, with the addition of a member from the Rocky Mountain, California, Texas and Louisiana-Arkansas districts be continued to advise the technical committee and to also report to the board of directors of the institute a recommended standard American Petroleum Institute lease form; and that the board make available the necessary funds for the conduct of activity by these two committees, and the findings of these committees be made available to the industry from time to time."

Henry McGraw's Minority Report

In a minority report submitted to the board of directors, Henry McGraw, vice president of the Gulf Oil Co., a member of the committee stated:

"The problems facing the committee were, in their major aspects, the same problems that confronted the committee of eleven appointed by the American Petroleum Institute in the year 1925 to investigate the problem of conservation and to report its conclusions to the institute. This committee of eleven, after a thorough investigation, made report to the institute in the fall of 1925. The gist of said report is found in the "summary of conclusions" signed by the full committee and reproduced in a lengthy dissertation of 'American Petroleum—Supply and Demand,' which is published in book form and was submitted to the Federal Oil Conservation Board appointed by the President of the United States.

"This summary of conclusions is short and is, I feel, consistent with the facts as they were found to exist, and, as I see the situation, furnishes an unanswerable argument against the legislation proposed by the report prepared by the committee of seven on January 6, 1927. The 'Summary of Conclusions' as published is attached hereto. It is likewise pertinent to call attention to the fact that at the public hearing held May 27, 1926, before the Federal Oil Conservation Board at Washington, the Hon. Charles Evans Hughes, counsel for the American Petroleum Institute, with the report of the committee of eleven fresh in mind, presented in his forceful way the substantial objections to such legislation as is proposed by the report of the committee of seven. Several of the members of the committee of seven were present at this hearing and, so far as I am advised, they did not then voice any objections to the argument made by Justice Hughes. The conclusions reached by the committee of eleven in 1925 and position taken by the eminent counsel for the Federal Oil Conservation Board in 1926, were, in my judgment, sound at that time, and nothing has happened since then to cause me to change my views in the premises."

The directors adjourned without adopting the report of the committee of seven on gas conservation. It was made the first order of business tomorrow morning. The board debated on it all today.

Co-operative Agreements

The board of directors of the institute adopted the following report from the committee on agreements appointed at the annual meeting in Tulsa last December:

"At the Tulsa meeting in December last a committee composed of Messrs. Veasey, Ames, Townes, Weil, Byles, Proctor and the writer was appointed under a resolution adopted by the board of directors of the institute reading as follows:

"'Resolved, that the president of the institute appoint a committee of seven to formulate and recommend to this board or its executive committee at the earliest practicable date a program of legislation, Federal and state, to be advocated by the institute giving sanction and effect to agreements by oil producers and for the curtailment of production in pools where and during periods when there is overproduction, having for their purpose the economical and orderly production of oil.'

"The committee believes that the purpose of the resolution would be accomplished if the oil-producing states, especially at this time California, Oklahoma and Texas, would pass a simple enactment reading, after a proper caption and enacting clause, as follows: 'It shall be lawful for operators or others at interest to make agreements whereby the production of crude petroleum is diminished or postponed during periods of overproduction and actual or economic waste, and justification for such agreements shall be deemed conclusive when and so long as the production of crude petroleum in the pool or pools affected exceeds available transportation facilities, or when and so long as, of crude petroleum, the production in the United States, together with imports, exceeds consumption in and exports from the United States.'

Action for Congress

"And the committee believes that the Federal Congress should be requested to enact similarly that 'It shall be lawful for operators or others at interest to make agreements whereby the production of crude petroleum which moves or is to move in commerce, as defined in the Act of October 15, 1914 (38 Stat. L. 730) is diminished or postponed during periods of overproduction and actual or economic waste, and justification for such agreements shall be deemed conclusive when and so long as the production of crude petroleum in the pool or pools affected exceeds available transportation facilities, or when and so long as, of crude petroleum, the production in the United States, together with imports, exceeds consumption in and exports from the United States.'

"The Federal Congress also should be requested, the committee thinks, to modify the present statutes governing the leasing of Indian lands and the public domain for oil and gas so as to give the secretary of the interior power in his discretion to relax drilling obligations during periods of overproduction and to withhold Indian lands at such times."

The Federal Oil Conservation Board today announced the names of three Government representatives on the committee of nine, as follows: E. C. Finney, Assistant Secretary of the Department of the Interior; Walter Brown, Assistant Secretary of the Department of Commerce, and Abram Meyers, Federal Trade Commissioner.

Oil Heating Supply

The board of directors also adopted the following resolution: "Resolved, that the board of directors of the American Petroleum Institute has full faith in the ability of the oil industry to meet the growing demand for oil for domestic heating purposes. The experience of the last generation plus the best forecast which science can make for the coming generation justifies such faith.

"The modern domestic oil burner gives a kind of household heating service which gas alone has supplied in the past, and in the country as a whole it gives that service cheaper. It is our belief that oil heating will not only supplant gas which is its present sole competitor, but like the gasoline automobile, establish a new standard of American home life and fix a level of comfort and convenience never before attained by any civilization, and at a price well below the limit of its economic value for that use."

The board authorized the president of the institute to appoint a committee of

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REPEAL OSAGE LEASE LAW, SAYS PRESIDENT

The national government is undertaking to join in the formation of a co-operative committee of lawyers, engineers, and public officers, to consider what legislation by the states or by the Congress can be adopted for the preservation and conservation of our supply of petroleum. This has come to be one of the main dependencies for transportation and power so necessary to our agricultural and industrial life. It is expected the report of this committee will be available for later congressional action. Meantime, the requirement that the secretary of the interior should make certain leases of land belonging to the Osage Indians, in accordance with the act of March 3, 1921, should be repealed. The authority to lease should be discretionary, in order that the property of the Indians may not be wasted and the public suffer a future lack of supply.

Institute Is Pledged to Co-operation

President E. W. Clark of A.P.I. in Annual Address Reviews Progress of Conservation Movement and Attitude of Industry

By E. W. Clark*
President, American Petroleum Institute.

It is of no particular importance whatever that I was born in New Hampshire amongst the granite hills at the base of the White Mountains, except that the atmosphere of that rigorous area was conducive to a proper and logical interpretation of two very much overworked words—waste and conservation—which recently have been recklessly and promiscuously applied to production of petroleum.

It was difficult back in early days in our home to wrest a proper and comfortable living from the thin soils of my native state and this made it imperative that everything should be strictly conserved and absolutely nothing wasted; therefore, I believe I should know something about proper conservation—we used the term "forehanded" in my boyhood days—also that I should have a fair measure of what waste means as applied generally but in connection with our business I must confess to some confusion.

What is waste in the oil business?

What is conservation?

I have made a study of these two terms as applied to the manner in which the petroleum industry is conducting its exploration and production operations. Some of our critics possibly have some inkling as to what one or both of the two words really mean, but generally speaking, most of them do not know any more than I about a proper interpretation of the two terms; and my conclusion, supplemented by studies made by competent attorneys, capable engineers and other technical men, leads me to believe that a proper and complete definition of either one is an impossibility. What is apparently conservation in some cases is in fact profligate waste in others, and vice versa.

Dangers of Legislation

Today attention is being called to the need for conservation. Strong appeals are being made from several quarters to arrive at the desired destination by writing upon the statute books measures enforcing conservation and prohibiting waste.

I believe the statements I have made with reference to the interpretation and application of the two words—waste and conservation—should convince you that such legislation would result in confusion, chaos and endless litigation.

The history of the conservation movement dates back several years before President Coolidge appointed the Federal Oil Conservation Board in December 1924.

M. L. Requa, general director of the oil division of the United States Fuel Administration during the war, in an address before the National Petroleum Congress in March 1919, stressed the need for bringing a higher degree of oversight and efficiency into the industry.

On October 7, 1924, George Otis Smith, of the United States Geological Survey, sounded a note against wastefulness and unco-ordinated effort on the part of the oil industry in the production of oil. He invited co-operation between the industry and the property owner and also between industry and the Government.

Later in October of the same year D. M. Folsom, then of the General Petroleum Corp. and C. R. McCollom, of Union Oil Co. of California, at a meeting of the Chamber of Mines and Oil in Los Angeles, both stressed the necessity for better engineering practice in oil recovery and pointed out the wisdom of co-ordinated action in the direction indicated by Mr. Smith.

Principles Being Studied

Henry L. Doherty in the same year suggested a plan of co-operative control of new oil fields. His plan appeared idealistic and unworkable. Nevertheless we must admit that today the principles laid down by these gentlemen, Requa, Smith, Folsom, McCollom and Doherty, are receiving serious consideration of some of the best minds in the industry.

In consequence of the creation by the President of the United States of the Federal Oil Conservation Board, appointed for the purpose of making a study of the nation's future supply of petroleum, a "Committee of Eleven" was named from the membership of the American Petroleum Institute, who in March 1925, formulated a report which was published in August of that year, entitled "American Petroleum—Supply and Demand."

The main criticism of the "Committee of Eleven" report on supply seems to have been that the amount of oil stated to be available to the nation was grossly overestimated.

I believe that the major part of the report on supply as it stands has, within the short period of two years, been thoroughly and entirely vindicated. While I realize a prediction is always dangerous, I venture the assertion that the time is coming when the work of the technical men who prepared the figures for this report will be full appreciated, and the statement may be truthfully made that in view of the information and light they had on the subject at that time the estimate on supply was not very much short of an inspiration.

In January, 1925, the American Petroleum Institute adopted a resolution to the effect that under the then existing customs and practices of the industry there was no appreciable or avoidable waste.

The directors of the American Petroleum Institute were right in January, 1925.

Advent of Technical Man

Since that date we have had some wonderful experiences and the advent of the technical man has shown us how little we knew in 1925, and that new knowledge is sufficient to indicate how little we know today of the real function of gas as it exists in the grounds with oil, and how much there is yet to be developed regarding the proper method of production thereof.

After a period of investigation of the facts, the Federal Oil Conservation Board, in its preliminary report of September, 1926, invited the industry to concentrate its thought and attention upon two great general principles: one in respect to the development of co-operation, and the other in respect to the use of gas, or energy as it is sometimes put, in producing oil. The report was a friendly challenge to us to attack these old problems in a purely constructive spirit. We had the choice of saying that we believed these problems insoluble, and therefore declined to waste time considering them; or, with open and constructive minds, to indicate our willingness to re-examine them and to ascertain whether there is a practical and workable answer. I believe that everyone must concede that we owe it to the public and to the industry to accept this challenge in the spirit in which it was given, and to bend every endeavor to bring about a constructive answer.

The activities of the Federal Oil Conservation Board during the three years of its existence have focused the attention of the oil industry, as never before, upon the fundamental practices of the industry. There has been the greatest period of self-examination and self-challenge in the history of this great industry. In the end it will be found that this self-examination and self-challenge will all be to the good.

At the annual meeting of the American Petroleum Institute at Tulsa last year resolutions covering the use of gas in oil production and the development of co-operation were adopted by the board of directors. I shall refer first to the more difficult problem, viz: that pertaining to the use of gas.

Difficulties Recognized

The Federal Oil Conservation Board declared that the prevention of the waste of gas was of paramount importance in the production of oil. This was a declaration of a principle. It was not a committal to measures whereby that principle could be carried into effect. The Conservation Board recognized the difficulties inhering in this problem.

At the Tulsa meeting of the Institute in 1926 the board of directors of the American Petroleum Institute formally agreed to that principle. The directors recognized that, without measures to carry the principles into effect, adherence to the principle would produce no practical advance. Therefore the board of directors appointed a committee, of which Mr. Marland is chairman to devise, if possible, and to recommend to the board measures whereby the principles could be carried into effect.

Specifically, a measure in the sense used in the resolution is a rule of action in respect to producing practice.

It was perfectly clear then—and if it was not, it is perfectly clear now after a year's experience in that matter—that to this committee was assigned a problem of the greatest complexity.

The real problem of oil conservation is whether a practical and equitable rule defining good practice in producing oil can be adopted.

The Practical Issue

The practical issue is whether we can develop the facts and the art of producing oil to the point where we can evolve new rules of neighborly conduct.

The committee of which Mr. Marland is chairman attacked the problem with vigor and intelligence; has carried on prolonged investigations; has sought and received the best technical, legal and practical advice available. It has searched the four corners of the industry, and gone outside of it; and has concentrated its attention upon the specific question whether a new rule of producing practice—practicable, just and constitutional—can be evolved.

We start with the fundamental fact that nature did not store our oil resources in glass pockets, in order that they might be seen.

Had nature been indulgent she would have put the oil in nice little compartments corresponding with the fences on each man's land.

Many years ago a court laid down what at that time was the only practicable rule, viz: let each take what he can get from the holes he drills on his own ground. Let each man's protection against his neighbor lie in his own diligence. This rule has never been changed and is still in force.

There is nothing new to oil men in these statements.

Everything said about waste, overproduction, price fluctuations, unnecessary

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*Before American Petroleum Institute, Chicago.

BIG WELLS IN PECOS INFLUENCE NOVEMBER'S GAIN IN NEW CRUDE

The enormous initial production of some of the completions in Pecos County, West Texas, had most to do with the large increase in the total initial production of the fields east of California in November. One hundred more wells were completed in November than in October, but the increase in initial production, 100, 857 bbls., indicates a considerable increase in the average initial production per well. In October, 1,025 new oil wells averaged 308 bbls. per well in initial output, while in November 989 new oil wells averaged 421 bbls. per week in first day production. There were 651 dry holes completed, an increase of 99 over the record for October, and the gas wells showed an increase of 37.

In new work there was a slight increase over October. Twelve more rigs and 42 more drilling wells at the close of November netted an increase of 54 operations over the October report.

SUMMARY OF ALL FIELDS

Completed Wells

Field—	Comp.	Prod.	Dry	Gas
Eastern	387	1,644	56	86
Central Ohio	53	56	13	33
Lima	21	339	2	0
Indiana	28	308	10	5
Michigan	4	80	1	0
Kentucky	98	2,509	36	2
Illinois	19	215	7	0
Kansas	127	12,991	45	16
Oklahoma	376	98,896	122	42
North Central Texas	308	17,832	158	13
West Texas	93	231,102	29	2
Texas Panhandle	31	3,990	7	8
East Central Texas	10	450	5	1
East Texas	11	....	2	9
Southwest Texas	54	227	26	20
Gulf Coast	96	32,127	41	2
North Louisiana	64	4,582	26	16
Arkansas	27	1,478	16	3
Montana	48	4,234	25	6
Wyoming	16	3,040	6	0
Colorado	15	731	7	2
New Mexico	11	138	9	1
Utah	2	....	2	2
Total November	1,909	416,769	651	269
Total October	1,809	315,912	552	232
Difference	100	100,857	99	37

Rigs and Wells Drilling

Field—	Rigs	Drlg.	Ttl.
Eastern	94	380	474
Central Ohio	19	66	85
Lima	4	34	38
Indiana	5	62	67
Michigan	6	20	20
Kentucky	3	127	130
Tennessee	0	36	36
Alabama	0	7	7
Mississippi	11	18	29
Florida	0	13	13
North Carolina	0	1	1
Illinois	3	31	34
Kansas	53	174	227
Oklahoma	129	770	899
North Central Texas	107	370	477
West Texas	115	307	422
Texas Panhandle	34	134	168
East Central Texas	0	10	10
East Texas	8	17	25
Southwest Texas	26	147	173
Gulf Coast	39	172	211
North Louisiana	53	123	176
Arkansas	15	67	82
Montana	21	80	101
Wyoming	21	147	168
Colorado	8	81	89
New Mexico	5	81	86
Utah	2	24	26
Total Nov.	775	3,499	4,274
Total Oct.	763	3,457	4,220
Difference	12	42	54

OKLAHOMA FIELDS

WELLS COMPLETED
Summary of Wells Completed

County—	Comp.	Prod.	Dry	Gas
Creek	33	1,265	12	6
Carter	10	762	4	..
Garfield	5	2,518	1	..
Grady	22	562	7	3

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Government Fails in Patent Club Case

Special Master Says Pooling of Patents Did Not Constitute Restraint of Trade. Gasoline Consumers Benefited

Holding against the Government in all of its major claims, Charles Martindale in a Special Master's Report filed in the District Court of the United States (Northern District of Illinois) recommended the dismissal for want of equity of the Government's suit involving the so-called "patent club." The report states that no evidence was introduced tending to show that the oil companies concerned had pooled their patents in the operation of cracking processes so that their action constituted a monopoly in restraint of trade.

Regarding the public interest in the case the report states that the development of the cracking processes by the defendant companies made it possible for the oil industry to keep pace with the gasoline requirements and market the product at a reasonable price. Gasoline, it was stated, is manufactured and sold under the keenest competitive conditions, which were in no way affected by the agreements between the defendant companies.

The Special Master's report also fails to agree with the Government's claim that the patents were anticipated by a prior art. Finally the charge that certain patents owned by one of the defendant companies were obtained by fraud is not sustained in the report.

The principal defendants in the case, which was filed by the Government in 1924, and the cracking processes controlled by the companies are, the Standard Oil Co. of Indiana (Burton); Standard Oil Co. of New Jersey (Tube and Tank); Gasoline Products Co. (Cross), and The Texas Company (Holmes-Manley). In addition to these defendants, approximately 50 refining organizations were named as secondary defendants. These companies were licensees of the processes owned by the principal defendants.

In its original petition the Government maintained that the principal defendants had pooled all their patents relating to the operation of cracking processes with the view of not only protecting each other from litigation but also to secure a monopoly on the art of cracking. The taking of evidence before a Special Master required approximately two years starting in 1925. Several months have been spent in the preparation of the report.

Prior Art Claim

Upon the issue made by the Government that the patents do not cover any new and useful inventions and were merely used to cover minor features, the report says these patents are: Substantial, valuable and highly useful improvements which have made possible the manufacture of cracked gasoline in commercial quantities, have increased the yield of gasoline per barrel of crude many times over and have enabled the supply of gasoline to meet every increasing demand."

The Master further found that "the procuring and treating of said patents as valid by the defendants is not a device to lend color or legality to any combination, conspiracy or monopoly," but they were procured in the regular and lawful manner in good faith for the purpose of producing a larger amount of gasoline from a given amount of crude petroleum and for supplying the critical demand in the United States.

Keen Competition

On the question of the charge by the Government that contracts between the principal defendants had stifled competition in restraint of trade, the Master declares that there was keen competition and rivalry. He said: "The competition between each and all of the defendants is actual and genuine, and the marketing rivalry is keen. The rivalry of the so-called "independents"—manufacturers of cracked gasoline— is of such volume and the competition so extensive and widely distributed that the defendants have no control, whatever, over either the supply or the market price of cracked gasoline. There is no evidence, whatever, of any attempt or action of any kind by the defendants, or any of them, to suppress competition, to control supply, to fix price, or to allot marketing territory."

History of Cracking

According to the report the Standard Oil Co. of Indiana discovered the first commercial process for making cracked gasoline and this process was practically the only one known or in use from about 1913 to 1920. And as other processes were discovered and patented, claim was made by the owners of the different patents that the other processes infringed such patents, and contracts were made among the different patent owners whereby they were given immunity from infringement from one another's patents.

These contracts, the Government in its suit contended, were in restraint of trade and constituted a violation of the Sherman Antitrust Law. Upon that question the Master finds as follows: "The conclusion of these agreements was beneficial to the public in that it removed the threat of interruption of the supply of gasoline and a consequent increase of price and offered the prospect of wider use of the cracking process with a consequently larger supply, and probably reduction of price, which, since the close of the testimony in this case, as a matter of current public history, has become a realization."

Reason for Agreement

The first adjustment of questions of conflicting patent rights in regard to cracking processes was made between the Standard Oil Co. of Indiana and The Texas Company. The contract affecting this adjustment, the Government charged, was the key to the whole alleged conspiracy, and violation of the Sherman Antitrust Law. Mr. Martindale, in discussing that proposition said:

"The two companies were confronted with a choice between a settlement and litigation. Litigation would paralyze progress in the industry and the profits and damages which might be covered in such an action ran into large figures, and would inevitably cause a serious financial loss to one or the other of the companies. Litigation, under such circumstances, would have been very unwise if any kind of reasonable settlement could be arrived at.

"The contract was advantageous to both of the companies and was advantageous to the public because it removed obstacles to the development of the industry and resulted in the production of gasoline instead of production of litigation.

"It was perfectly obvious that the sensible thing for both to do was to exchange immunities and grant reciprocal licenses under their respective patent rights if they could agree upon terms.

"As the Burton process and the Holmes-Manley process were, at that time, the only two commercial cracking processes in the field, and as there were 15 or 20 refining companies practicing the Burton process, the execution of the contract cleared up the entire industrial situation from a serious threat of complications, interruptions and liabilities. The general public was also benefited because it was not at all interested in patent controversies or litigations, but only in an ample supply of gasoline at reasonable prices.

"By the development of the Burton process and the Holmes-Manley process, and the settlement of the controversy between the owners of the two processes, the public had an ample supply of gasoline at reasonable prices, and but for these circumstances, undoubtedly, there would have been a great shortage of gasoline and the public would probably have paid double what it did pay for the commodity.

"By the contract there was no limitation upon the perfect freedom of action and perfect control of each over its own patents and processes. There was no restraint upon the contracts of either. Each was free to execute as many licenses of its own process with immunity from any attack from the other as it might choose. There was no restraint of competition between the two companies and there was no agreement relative to either the amount of production or the price at which gasoline could be sold."

Cracking Processes

A large part of the testimony in the voluminous record, submitted with the Master's report, consists of expert testimony produced by the Government in an attempt to show that the patents covering the various processes contained nothing substantially new but that the inventions disclosed in such patents had been anticipated by the prior cracking art. A large part of the 380 pages of the Master's printed report is taken up with the consideration of the different cracking processes covered by the patents owned by the different patent owning defendants and are the patents cited by the Government as showing such anticipation.

The Master found that all the inventions, disclosed by the patents owned by the principal defendants, covered new, useful and patentable processes and that there is nothing in the large amount of prior art cited, which showed that such patented processes were not new and patentable. He finds specifically with regard to practically each of the prior art references, that it does not disclose at all the invention of the patent against which it is cited.

Expert Testimony

The Government relied for its expert testimony of the technical and scientific matters involved, upon Dr. Ralph H. McKee, professor of chemistry at Columbia University. Of him the Master said: "At some points in his testimony, in an effort to show want of novelty, his interpretation of prior art disclosure was not only overstrained, but quite beyond any reasonable construction of the description."

The defendants relied for their expert testimony upon the evidence of Robert E. Wilson, head of the research department of the Standard Oil Co. of Indiana. Of him the Master said, he: "was impressed with the candor, fairness and superior practical knowledge and experience of Mr. Wilson, defendant's expert in dealing with all the prior art references."

"For this reason, where there is a irreconcilable conflict, the Special Master has adopted the testmony of Mr. Wilson as much more reasonable and accurate."

No Fraud

The report also states that in its attack upon the validity of the Adams patents (now owned by The Texas Company) on the ground that they were procured by fraud, the Government failed to prove its contentions. The charge of the Government was that Joseph H. Adams, to whom was issued the patents attacked, and afterwards acquired by The Texas Company, had filed with the patent office false affidavits for the purpose of procuring such patents. The Master finds against the Government on this issue stating that the affidavits were in fact true.

Royalties Not Oppressive

According to the Master the charge that the patent-owning defendants have imposed burdensome and oppressive royalties is not sustained by the evidence.

(Continued on Page 152)

NATURAL GASOLINE OPERATORS HOLD MEETING AT BRECKENRIDGE

By James H. Dameron

BRECKENRIDGE, Tex., Dec. 3.—Lengthy and enlightening talks, taken part in by the approximately 200 attending the plant operators meeting of the Natural Gasoline Association of America held at Breckenridge, followed each paper read or each address given.

O. F. Kluenter, Fort Worth, Tex., and of the Smith Separator Co., told the operators unfiltered air was responsible for frequent valve cleaning, replacement and grinding of valves, reboring of cylinders, loss of capacity, excessive consumption of lubricating oil and carbon deposits and other troubles with compressors.

In reviewing the mechanical troubles traced to dirt and foreign substances entering the intake on engines or compressors Mr. Kluenter said the foreign substance doing the most harm are particles of sand which are the same thickness as the film of oil between the cylinder rings and wills of the cylinder.

He said air filters cannot be too strongly recommended but a filter is no better than the care it receives. Air filters should be cleaned and recharged as recommended by the manufacturer and it will be one of the most valuable specialties in a plant, he added.

Use of Air Filter

In dealing further with the paper on air filters in the natural gasoline plant Mr. Kluenter said, "The air filter properly used can clean the air of from 90 to 95 per cent of foreign substances. The time between cleaning and recharging periods should be from two to six weeks, depending on the local conditions around the plant. Figures show that under ordinary conditions in industrial districts, air contains four grains of dust per 1,000 cubic feet. If the compressor with a capacity of 500 cubic feet per minute is operated for 48 hours it is estimated that 5,760 grains of dust or about 1 pound, will have accumulated. Your own imagination will tell you what a pound of dust will do when mixed with lubricating oils in the cylinders."

John O'Connor, of the Gas Engineering & Construction Co., Tulsa, Okla., opened the morning session when he addressed the meeting concerning "The Operation and Maintenance of Two Cycle Gas Engines." Keen interest in his subject was developed and a lengthy discussion followed.

Gas Measurement

D. A. Sillers, of the Lone Star Gas Co., Dallas, Tex., closed the morning session program with a discussion on "Gas Measurement." His remarks brought about considerable discussion on the measurement of gas from the field to plants. Mr. Sillers brought out that if the field meters and the meters measuring the residue gas checked the plant is paying too much for its gas.

He urged close co-operation between the men in the office of the measuring departments and the field men and was of the opinion that about half of the errors in measurement lies in the ineffi-

(Continued on Page 152)

Excellent Record of Church Fields

Actual Production to Date Does Not Represent the Capabilities of Crane County District. Effect of Curtailment

By C. D. Lockwood

The Church-Fields-McElroy Pool of Crane County, West Texas, had produced 17,669,917 bbls. of 31 gravity crude from the time the first well was completed in April, 1926, up to November 1 this year. Two hundred and four producing wells had been completed on the latter date and they were still averaging more than 550 bbls. per day each. These 204 wells had at that time yielded an average total of 86,617 bbls., or 8,661 bbls. per acre, allowing 10 acres to the well.

The last week in November, 211 wells in this excellent pool were producing 105,537 bbls. daily, or about 500 bbls. per well per day. Recent completions, too, have come in for an average initial production that will sustain this figure for some time, most of them being in the 600 to 800-bbl. class. And several of the best leases are partially pinched due to pipe line congestion and uncertain markets for this crude.

It is almost impossible to figure decline curves or per acre recovery in this pool because of the conditions which have prevailed during the past year, and the irregular development that has been caused by lack of proper outlet for the oil.

Many good wells have never been allowed to flow at their capacity, and no one can say just what effect this will have on ultimate recovery. Some producers which were rated at 9,000 and 10,000 bbls. had to be shut in entirely and when they were opened up they were never as good as their initial flow. One well on the north end of the pool was flowing about 1,200 bbls. daily when the pipe line connection was severed, and since then there has been no production from this lease, not due to natural causes but to enforced shut down.

Production Curtailed

Under conditions such as these, the actual production to date does not represent the capabilities of the Church-Fields-McElroy Pool. And yet this actual output is an excellent record.

The best 80 acres in the field up to November 1 was the Eastland Oil Co. and Collett's property in Section 47. The first well came in January 29 of this year flowing 1,800 bbls. daily with the tools swinging in the hole and up to the first of November the eight wells had produced a total of 2,201,305 bbls. or 27,516 bbls. per acre. The average production of this lease during November has been about 9,000 bbls. daily, which has added approximately 3,375 bbls. per acre to the total, so that the recovery per acre up to the first of December has exceeded 30,000 bbls.

Next in line on November 1 was Simms Oil Co. and Atlantic Oil Producing Co.'s University-C lease, which adjoins the Eastland Oil Co. and Collett property on the east. This 80 acres had yielded 2,073,041 bbls. at that time, or an average of 25,913 bbls. per acre, and was still putting out approximately 18,000 bbls. a day all during November, with some of the wells pinched. This means that about 6,750 bbls. an acre was produced during the past month, a normal lifetime production for many leases in other fields. That will raise the total recovery per acre to about 32,600 bbls., or considerably greater than the Eastland property.

Another good lease is Simms and Atlantic's University-A in Section 39, diagonally northwest of the Eastland and Collett 80 acres. This has been only partially developed, two wells having been drilled along the south and east lines but only two others on the inside locations. The total output to November 1 was 1,287,552 bbls., or 14,306 bbls. per acre, counting just 90 acres developed. Production has averaged about 4,000 bbls. during the past month, adding some 1,300 bbls. an acre to the total. Wells Nos. 2 and 3 on this quarter section were rated good for about 9,000 each when they came in but had to be pinched and were damaged in so doing.

Another Good Property

In the same part of the pool, Tidal Oil Co. and Turman & Maxwell's "F" lease just south of Simms and Atlantic's "A," is another sweet property. It had a total of 1,194,547 bbls. to its credit the first of November, an average of 17,065 bbls. for each of the 80 acres. During November it has made about 4,000 to 4,100 bbls. daily but is pinched in considerably. Tidal Oil Co. has a gas lift plant on this lease but has not been able to use it to any extent because the company's contract with Southern Crude Oil Purchasing Co. calls for only 10,000 bbls. daily and the University-I lease in Sections 47 and 48 is yielding more than 6,000 bbls daily, with some of its wells pinched also. They also have gas lift on this property.

In figuring per acre recovery, it is difficult to figure out how many acres to allot certain wells. Engineers differ on the amount of drainage in this field, and some of the Gulf Production Co.'s wells on the J. T. McElroy and Crier-McElroy land are standing out in the middle of 40 acres or more. Section 197, Block F, in fact, has only three wells covering the entire section, while Gulf's No. 6 Crier-McElroy is alone in Section 196. There are also only two tests in Section 204. It is hardly reasonable to assume that future wells drilled in between these tests will produce as much as the original wells, and yet there is a limit to the extent of drainage in this lime pay horizon. Perhaps 20 acres to the well under these conditions would be a fair allotment for the purpose of figuring per-acre recovery.

The outstanding feature of the Church-Fields-McElroy Pool from the standpoint of spectacular interest is the 182-acre strip, 400 feet in width, which is owned by the Landreth Production Corp., of which Ed A. Landreth of Fort Worth is the head.

From June 10 this year until November 1 the total output of 16 wells which had been drilled in a straight line bisecting the Church-Fields sector and the Gulf-McElroy block had reached 1,466,725 bbls., and the average production during November was about 12,000 to 13,000 bbls. daily. This strip, 400 feet wide, is producing almost as much oil as the strip half a mile wide which lies just north of it in Block 30 of the University Lands.

Surprising Lease

Everything about this lease, from its inception to the present time, has been spectacular. Jax Cowden, big West Texas land owner, and J. E. Anderson, lease broker, learned that a vacancy was thought to exist between Block 30 and Block F and filed on the land. They obtained it from the state and offered it to several companies operating in the field, but at that time the majority opinion favored the belief that a "saddle" probably separated the Church-Fields Pool from the Gulf-McElroy Pool and that this vacancy would likely cut right across a barren stretch of territory. Most oil men figured that it would be expecting too much for these two big fields, then nearly 3 miles apart, to join up. Ed Landreth, however, believed the field to be a unit and purchased the strip for $70,000.

The vacancy as actually surveyed was triangular in shape, being wider at the east end, and tapering down to a point on the west end. By agreement with the Gulf Production Co. it was made uniformly 400 feet wide and about 3½ miles long.

Then followed a hectic race for production along both sides of the strip. Pecos Oil Co. started a test on the south line of their quarter section north of Landreth and he moved in an offset to it. The Gulf Production Co., of course, immediately started an offset to Landreth's No. 1, and then within a few days there were 18 derricks up along the strip and on both sides of it.

Landreth obtained his first production June 10, and as soon as this part of the field was shown to be productive, the drilling activity spread out until the field was 16 locations wide.

Now Landreth has on this 400-foot property 16 derricks, 31 tanks of 55,000-bbl. capacity, an air plant and other miscellaneous equipment necessary for the operation of a lease.

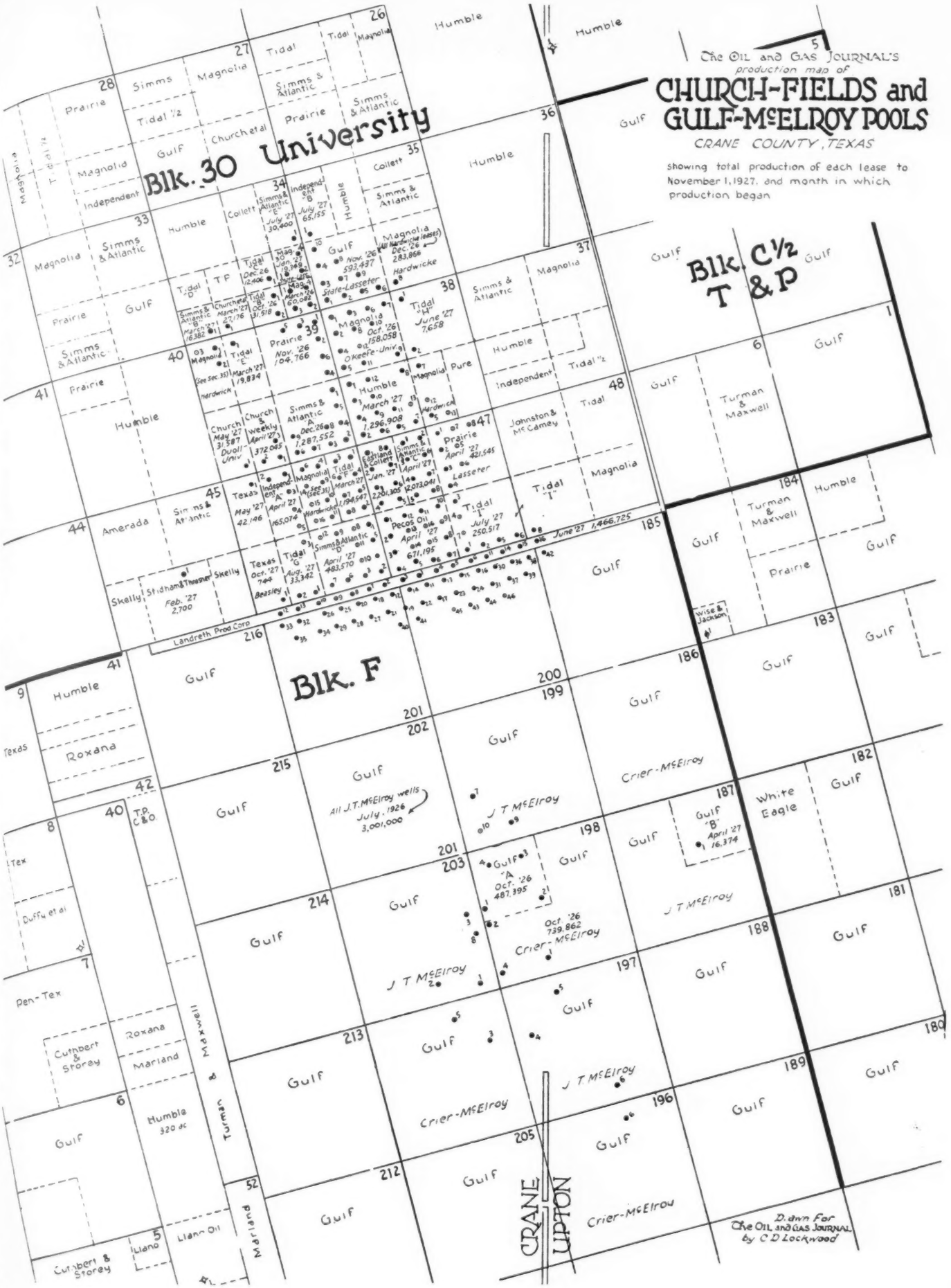
During the past few weeks some of the wells in this field have shown water in amounts up to 15 per cent. The water problem, however, does not appear to be serious, and in some cases the amount of water is decreasing rather than increasing.

Eastland Oil Co. and Collett's lease has five wells making water in some amount. Last week No. 3 was making 1½ per cent b. s.; No. 4, 1 per cent water and 2 per cent b. s.; No. 5, 2 per cent b. s.;

(Continued on Page 152)

TABLE OF PRODUCTION BY LEASES IN THE CHURCH-FIELDS-M'ELROY POOL

Company, Lease—	Acres	Description	Date Prod'n Began	Total Prod'n to Nov. 1, 1927	Number of Wells	Prod'n per Acre*	Present Prod'n D'ly Av.
Church et al:							
University	40	SE SW Sec. 34, Blk. 30	March, '27	27,176	1	2,717	105
Church & Weekly:							
University	80	E½ SW Sec. 39, Blk. 30	April, '27	372,045	3	12,401	1,604
Church & Fields:							
Duoll-University	80	W½ SW Sec. 39, Blk. 30	May, '27	31,587	1	3,158	167
Eastland Oil Co. & Collett:							
University	80	W½ NW Sec. 47, Blk. 30	Jan. 29, '27	2,201,305	8	27,516	8,792
Gulf Production Co.:							
Crier-McElroy		Sec. 196, E½ & SW Sec. 198 and Sec. 204 Blk. F	Oct., '26	739,862	6	12,331	....
Crier-McElroy A	160	NW Sec. 198 Blk. F	Oct., '26	487,395	4	12,184	....
J. T. McElroy		Secs. 197, 199, 200, 201, 202, 203, Blk. F	July, '26	3,001,657	42	7,147	....
J. T. McElroy B	160	NE Sec. 187, Blk. F	April, '27	16,374	1	1,637	....
State-Lasseter	160	SW Sec. 35, Blk. 30	Nov., '26	593,437	10	5,934	....
Total				4,838,725	63	....	21,588
Humble Oil & Refining Co.:							
University	160	SW Sec. 38, Blk. 30	March, '27	1,296,908	12	10,807	6,186
Independent Oil & Gas:							
University A	80	E½ NW Sec. 46, Blk. 30	April, '27	165,074	2	8,253	†460
University B	80	W½ NW Sec. 35, Blk. 30	July, '27	65,155	1	6,515	†12
Total				230,229	3	....	....
Landreth Producing Corp.:							
State-Cowden-Anderson	182.8	400-foot vacancy between Blk. 30 and Blk. F	June 10, '27	1,466,725	16	9,167	12,814
Magnolia Petroleum Co.:							
University-Harwdicke	400	W½ NW Sec. 39; W½ NE Sec. 46; W½ SE Sec. 38, and SE Sec. 35, Blk. 30	Dec., '26	283,866	9	3,154	3,815
O'Keefe-University	160	NW Sec. 38, Blk. 30	Oct., '26	158,058	10	1,580	1,847
State-Lasseter	40	NE SE Sec. 34, Blk. 30	Jan., '27	19,349	3	645	199
Magnolia et al University	40	SE SE Sec. 34, Blk. 30	March, '26	60,082	4	1,502	79
Total				521,355	26	....	5,940
Pecos Oil Co.:							
University	160	SW Sec. 47, Blk. 30	April, '27	671,195	11	6,101	4,112
Prairie Oil & Gas Co.:							
University	160	SW Sec. 47, Blk. 30	Nov., '26	104,766	6	1,749	†53
State-Lasseter	160	NE Sec. 47, Blk. 30	April, '27	421,545	4	10,538	6,295
Total				526,311	10	....	6,354
Simms & Atlantic:							
University A	160	SE Sec. 39, Blk. 30	Dec., '26	1,287,552	9	14,306	4,079
University B	40	SW SW Sec. 34, Blk. 30	March, '27	16,382	1	1,638	58
University C	80	E½ NW Sec. 47, Blk. 30	April, '27	2,073,041	8	25,913	†17,885
University D	160	SE Sec. 46, Blk. 30	April, '27	483,570	8	6,045	†4,177
University E	80	E½ NE Sec. 34, Blk. 30	July, '27	30,400	1	3,040	206
Total				3,890,945	27	....	26,405
Stidman & Thrasher:							
University	160	W½ SE & E½ SW, Sec. 45	Feb., '27	2,700	1	270	18
The Texas Company:							
University	80	W½ NW Sec. 46, Blk. 30	May, '27	42,146	1	4,215	225
University-Beasley	80	W½ SW Sec. 46, Blk. 30	Oct., '27	744	1	74	40
Total				42,890	2	....	265
Tidal Oil Co. et al:							
University B	40	SW SE Sec. 34, Blk. 30	Oct. '26	31,518	2	1,576	62
University C	40	NW SE Sec. 34, Blk. 30	Dec., '26	12,406	1	1,240	19
University E	80	E½ NW Sec. 39, Blk. 30	March, '27	19,834	1	1,983	62
University F	80	E½ NE Sec. 46, Blk. 30	March, '27	1,194,547	7	17,065	†4,279
University G	80	E½ SW Sec. 46, Blk. 30	Aug., '27	33,342	2	1,667	†173
University H	160	NE Sec. 38, Blk. 30	June, '27	7,658	2	383	40
University I	160	SE Sec. 47, Blk. 30	July, '27	250,517	5	5,010	†6,200
Total				1,549,822	20	....	10,815
GRAND TOTALS, CHURCH-FIELDS-M'ELROY POOL				17,669,917	204	8,661	105,537


The Oil and Gas Journal's
production map of
CHURCH-FIELDS and
GULF-McELROY POOLS
CRANE COUNTY, TEXAS
showing total production of each lease to November 1, 1927, and month in which production began
Blk. 30 University
Blk. C½ T & P
Blk. F
Humble
Gulf
Simms & Atlantic
Magnolia
Prairie
Tidal ½
Tidal
Collett
Independent
Church et al
Duvall Univ
Texas
Amerada
Skelly
Roxana
Pen-Tex
Cuthbert & Storey
Marland
Humble 320 ac
Liano Oil
Turman & Maxwell
White Eagle
Crier-McElroy
J T McElroy
All J.T. McElroy wells July, 1926 3,001,000
Landreth Prod Corp
CRANE
UPTON
Drawn for The Oil and Gas Journal by C.D. Lockwood

Signal Hill Field Stages Comeback

Deeper Sands at Long Beach Expected to Reach 180,000 Bbls. in Next Few Months. Wells Drilling and Producing

By Martin Van Couvering
Consulting Engineer and Petroleum Geologist.

Several years ago the Long Beach oil field, otherwise known as Signal Hill, became known as the wonder field of California. At that time only a part of its remarkable vitality was recognized. In spite of the fact that it is one of the most closely drilled fields in the country, its daily production has never fallen below 90,000 bbls. since the spring of 1923. Present indications are that in the next few months this figure will be nearly doubled. A failure of this random prediction will not be due to the drilling of an insufficient number of wells. At the time of writing, more than 100 wells are in the process of being drilled—all of them presumably intended to attain depths ranging from 5,000 to 6,000 feet, depending upon their positions on the subsurface structure. Some of these wells will fail to reach their goal on account of mechanical troubles; others on account of financial and legal troubles; but a considerable number will be placed on production in the deep sands. The term "deep sands" is, of course, relative. In 1922 it meant a depth of 3,500 feet below the surface; the next year it was 5,000 feet; and now it is from 5,500 to 6,000 feet.

In view of the spirited drilling campaign which is now under way in this field, it is interesting to note that on August 6, 1923, the Shell Co. of California completed its No. 3 Dobyns, situated near the intersection of Willow Street and Cherry Avenue, at a depth of 5,471 feet. This is about 2,900 feet below the top of the Alamitos zone as determined by the State Mining Bureau. This well had an initial production of 4,053 bbls. and is still producing. At the time of writing, no other well is known to be producing from a greater stratigraphic depth. To be equally deep, correlatively, a well in the vicinity of American Avenue in the west end of the field, or south of State Street in the east end of the field, must be about 6,500 feet deep.

During the year 1923 about 20 wells were drilled more than 2,400 feet below the top of the Alamitos zone. Most of these were drilled by the Shell Co., the California Petroleum Corp. (then Petroleum Midway Co., Ltd.), and the General Petroleum Corp. The greatest footage during that year was obtained by the General Petroleum Corp. in its No. 1 Clock with a depth of 5,972 feet. This well was, however, placed on production at a considerably less depth.

During the years 1924, 1925 and 1926 very few deep wells were drilled.

On November 29, 1926, the Richfield Oil Co. completed it No. 8 Haas with an initial production of 2,651 bbls. This well, probably more than any other, is responsible for the renewed interest in the Long Beach oil field. Immediately after its completion a spirited drilling campaign began, and at the time of writing 21 new completions in the deep sand have been made.

Some of the large producers completed during 1927 are:

California Petroleum Corp.'s No. 6 Davidson.

E. B. Campbell's No. 1 Well.

Clune-Doyle's No. 2 Well.

L. T. Edwards' No. 1 Brayton.

Graham & Loftus' No. 3 Lightburn.

Pan American Petroleum Co.'s No. 3 Chainey.

Pan American Petroleum Co.'s No. 1 Pyle-Coffin.

Richfield Oil Co.'s No. 8 Booth.

Richfield Oil Co.'s No. 11 Haas.

Richfield Oil Co.'s No. 1 Kelly.

Shell Co. of California's No. 13 Alamitos.

About a half dozen of the deep wells completed during the current year have proved decidedly disappointing in the amounts of oil produced. An equal number of those completed in earlier years fall in the same category.

The balance of the 44 deep wells are fair or good producers.

As a result of its latest rejuvenation, Long Beach oil field will probably continue to produce more than 90,000 bbls. per day for another year or so. It has long outdistanced all other fields in the country in the length of time during which it has maintained such a large daily production.

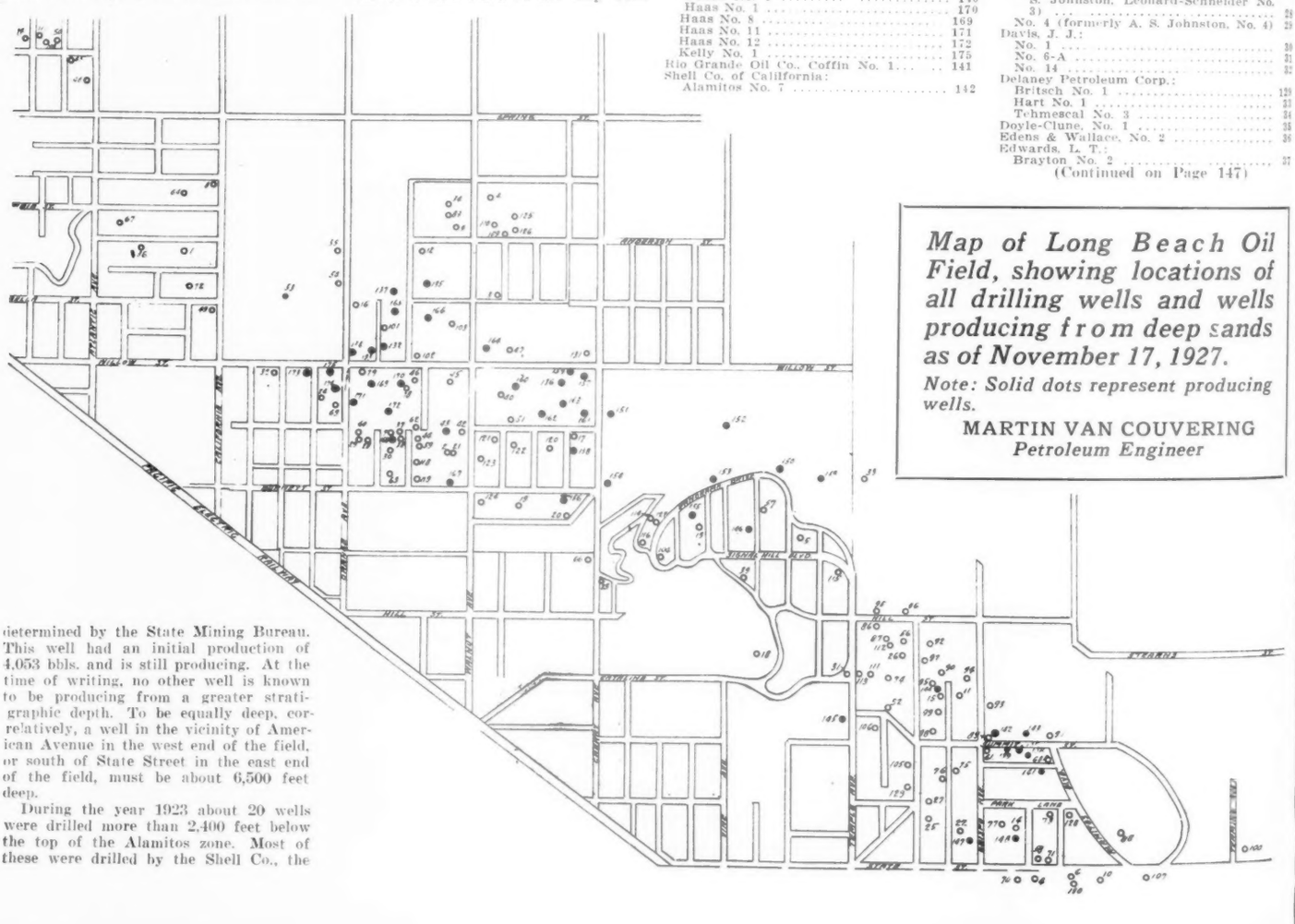
Producing Wells of Long Beach Field Having a Penetration of 2,400 Feet or More Below the Top of the Alamitos Zone
(Status as of November 17, 1927)

Company and well—	Number on map
Bush Voorhis, Bess No. 2	157
California Eastern:	
Marine No. 11	132
Marine No. 15	133
Marine No. 18	134
California Petroleum:	
Davidson No. 6	135
Gerrard (7) No. 1	136
Harlow Kent No. 8	137
McDavid No. 2	158
Robinson No. 3	156
Schilling (20) No. 2	167
Yochem (13) No. 2	159
Campbell, E. B., Campbell No. 1	147
Davis, J. J., No. 9	145
Doyle-Clune, No. 2	144
Edwards, L. T., Brayton No. 1	168
General Petroleum Corp:	
K. & H. No. 3	164
Signal No. 1	160
Graham & Loftus, Lightburn No. 3	173
Pan American:	
Chainey No. 3	174
Anderson No. 2	138
Pyle-Coffin No. 1	139
Richfield Oil Co.:	
Booth No. 8	140
Haas No. 1	170
Haas No. 8	169
Haas No. 11	171
Haas No. 12	172
Kelly No. 1	175
Rio Grande Oil Co., Coffin No. 1	141
Shell Co. of California:	
Alamitos No. 7	142
Alamitos No. 13	143
Andrews No. 3	151
Cosel oom No. 2	152
Cresson No. 7	153
Cresson No. 10	154
Dobyns No. 1	161
Dobyns No. 2	162
Dobyns No. 3	163
Foster No. 1	149
Goddard No. 3	150
Hamilton No. 1	148
Nicholson No. 3	155
Picker No. 2	176
Stratton No. 1	166
Travis Drilling Co., No. 1 (formerly H. R. MacMillan No. 1)	146

Drilling Wells in Long Beach Field
(Status as of November 17, 1927)

Company and well—	Number on map
Acme Petroleum Corp., Namron No. 4	1
Bolsa Chica Oil Co., Mutual No. 4	2
Bush Voorhis, Graham No. 2	3
California Eastern:	
Campbell No. 1	4
Capitol No. 1 (formerly Capitol Oil, Garner Kelly No. 1)	5
Maaser No. 1	6
Marine No. 7	7
Marine No. 21	8
Marine No. 28-A	9
Peacock No. 1-A	10
California Petroleum Corp.:	
Brown No. 3	11
Davidson No. 7	12
Ellis No. 2	13
Flower State No. 2	14
Griswold (1) No. 2	15
Lewis No. 2	16
McDavid No. 3	17
Perrin No. 2	18
Reedy No. 2	19
Robinson No. 4	20
Schilling No. 4	21
Campbell, E. B., Campbell No. 2	22
Cannon, Tom J., No. 2	23
Casa Blanca Oil Co., No. 2	24
Cox, J. W., No. 1	25
Crown City Oil, Graham No. 2	26
Dabney Johnston Corp.:	
Schneider No. 2 (formerly A. S. Johnston, Schneider No. 2)	27
Leonard-Schneider No. 3 (formerly A. S. Johnston, Leonard-Schneider No. 3)	28
No. 4 (formerly A. S. Johnston, No. 4)	29
Davis, J. J.:	
No. 4	30
No. 6-A	31
No. 14	32
Delaney Petroleum Corp.:	
Britsch No. 1	129
Hart No. 1	33
Tehmescal No. 3	34
Doyle-Clune, No. 1	35
Edens & Wallace, No. 2	36
Edwards, L. T.:	
Brayton No. 2	37

(Continued on Page 147)



Map of Long Beach Oil Field, showing locations of all drilling wells and wells producing from deep sands as of November 17, 1927.

Note: Solid dots represent producing wells.

MARTIN VAN COUVERING
Petroleum Engineer

Corrosion of Refinery Equipment

Sour Crudes of Texas Fields Present New Problems in Refinery Processing and All Types of Storage Tanks

By Brian Mead*
Humble Oil & Refining Co.

Corrosion in refinery equipment has been the subject of numerous discussions in the literature in the past. Some of the most comprehensive work has been done by the Standard Oil Co. of Indiana and was published by R. E. Wilson and W. H. Bahlke.† In comparatively recent times, with the very rapid increase in the production of sour crude which it has become necessary for the petroleum technologists to use, the problem has become much more acute. At the present time it is quite safe to say that corrosion, consequent upon the running of such sour crudes, is receiving very widespread attention at the hands of petroleum technologists since they are finding that without such studies their refinery equipment is rapidly eaten up and their depreciation costs are enormously increased. In view of this condition of affairs, it may not be out of place to give a summary of the method of handling sour crude in one refinery. This paper deals with this aspect of the work.

It has long been felt that the question of the sulphur content of a crude, from the viewpoint of corrosion, was by no means the whole story. Thus Morrell‡ and his coworkers have recently shown that it is possible to take two crudes, one of which has a very much higher sulphur content than the other, and yet to have comparatively little corrosion in running the crude of higher sulphur content, while that of lower content will eat out the equipment in a very short space of time unless adequate preventive measures are taken. There is then, apparently some other factor which is entering into the corrosion situation with regard to these crudes.

At the last annual meeting of the American Petroleum Institute it was clearly demonstrated that this other agency was the presence of smaller or larger quantities of salts of the alkaline earth metals, in particular of calcium and magnesium chlorides. Both these chlorides are comparatively readily hydrolyzed by moisture to give hydrochloric acid. This, in conjunction with the hydrogen sulphide, which is either present in the crude originally as such or is formed by thermal decomposition of the sulphur compounds present in the crude, sets up an extremely corrosive condition which all refiners are finding it very difficult and expensive to deal with. It is in combating this combined effect of hydrochloric acid and hydrogen sulphide that anticorrosive measures are largely concerned.

It will be desirable in studying this subject of corrosion to divide it into two parts: First, that dealing with corrosion which occurs during the storage of the crude prior to its being put through the refining operation; and secondly, corrosion occurring during the refining operation.

Corrosion in Storage

Crude storage tanks in which sour crudes are being handled are, throughout the country, causing a great deal of trouble on account of the fact that the decks of the tanks are corroding very rapidly indeed. Not only is this expensive on account of the cost of replacing the decks which have corroded out but it also constitutes a very considerable hazard. This hazard exists on account of the formation of comparatively large quantities of iron sulphide on the roofs of tanks. As is well known, this compound spontaneously oxidizes when exposed to the air and in so doing it generates sufficient heat to cause it to glow. This is the reason for the well-known phenomenon of "sulphur glow," to which references are to be found in the literature and with which every petroleum technologist is becoming increasingly familiar. In some cases, at the same time that the iron sulphide is formed there is also formed some amount of free sulphur and consequently, the glow has been wrongly attributed to oxidation of the sulphur itself rather than of the iron sulphide. It has been our experience that in all cases where the glow has taken place it has undoubtedly been due to the oxidation of iron sulphide and a number of cases have been noted where it has occurred in the absence of free sulphur.

Crude Oil Storage

Crude storage tank corrosion appears to be due to a combination of three influences: (1) Hydrogen sulphide which is in solution in the crude, and which, at ordinary prevailing temperatures, tends to come out of solution from the crude. (2) Water vapor either from water coming from the crude itself or from the atmosphere. (3) Oxygen from the air. To this may be added a fourth factor, namely, hydrocarbon vapors, which, although they may not actually influence the deterioration of the iron itself, yet may render inefficient any method of attempting to prevent this deterioration by the use of a protective coating since almost any kind of such coatings will be more or less affected by continued exposure to such hydrocarbon vapors.

So serious has the corrosion of crude storage become that it is necessary for both technologists and paint manufacturers to work hand in hand toward a satisfactory solution of this very pressing problem. In our experimental work on protective coatings in this company we have felt that since no one in either industry had any satisfactory proven way of preventing corrosion, it was necessary for us to take any and every kind of protective coating that seemed to offer even the smallest chance of success in our attempts to arrive at the solution of the problem. Accordingly, paint samples were prepared using new tank steel and preparing the surface according to the best advice of the different paint manufacturers. These test panels were placed in crude storage tanks which were constantly being worked in order that the combined effects of all four variables which have been mentioned above might be observed over long periods of time. In order that the samples might be at a temperature as nearly as possible equal to that of the deck of the tank, the panels were jammed between the supporting girders and the tanks themselves. At intervals of 30 days they were withdrawn for examination and were then replaced in the tank. As the result of tests extending over a period of 11 months a few protective coatings have been found which appear to offer considerable promise for use in this connection.

Paint Classification

These may be divided into two broad classifications. First ordinary paint: Of such coatings probably the most satisfactory which has been found is a red lead primer together with a top coat of any of the ordinary resistant paints. A paint of this type has given complete protection over the entire period of 11 months. The top coat went bad within 60 days but the primer is still entirely satisfactory and the metal surface is still in as good condition now as when it was put into service. This is difficult to explain, because hydrogen sulphide should attack any lead compound very readily. The fact remains, however, that it has given very satisfactory service under the test conditions stated, although we have as yet no information on its performance under actual service conditions. Second, a coating of the lacquer, varnish or enamel type. There are a number of such protective coatings on the market and several appear to offer considerable promise of success.

In giving these results it is to be understood clearly that as yet the period of test is considered insufficient for making any definite recommendation as to the type of paint to be employed and while these coatings have been specifically mentioned as having been found satisfactory in our test it is not known yet how they will stand up under more extended tests or under actual application to the roofs of the tanks. On a future occasion we hope to have more data to offer in this respect since we are at the present time trying out a number of protective coatings on several of our crude storage tank roofs.

In deciding what type of protective coating shall be employed in any given case, one of the primary considerations should be the ease with which the paint can be applied and also the degree of cleaning which it is necessary to give the tank before the application of the coating. The use of the second broad classification of protective coatings would seem to be more desirable in cases where new roofs are being put in, since then it is possible to get an absolutely clean surface for the lacquer or varnish to bite on to and this will greatly increase the efficiency of the protection afforded.

It is apparently not necessary to give as intensive cleaning to a surface which is to be protected by a paint since in such cases there is normally present in the primer some chemical which will prevent the future deterioration of the surface itself. In all cases, however, where the roofs of tanks which have been in service with sour crudes for some time before they are painted it seems to be highly desirable first of all to ship, beat and scrape off as much of the adherent scale as it is possible to remove by those means and then to finish up by sand blasting the entire surface which is to be painted.

Only by this means can absolute assurance be obtained of complete removal of the products of past deterioration which, if they were not removed, would cause rupture of the protective coating from the under side. During this cleaning operation the utmost care must be taken in handling any deposits of iron sulphide which are adherent to the iron work of the roof. As this iron sulphide dries up it is spontaneously inflammable and it is necessary to take precautions to assure that no trouble arises on this account. In addition to this the iron sulphide scale seems to have an irritant action on the skin, another feature which should be guarded against. All scale which is removed during the cleaning of such tanks should be carefully removed from the tank and spread out over the

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*American Petroleum Institute, Chicago.
†Industrial and Engineering Chemistry 17, 355-8 (1925.)
‡Communicated at the Detroit meeting of the American Chemical Society, September, 1927.

TO CONTINUE YATES PREVENTION POSSIBLY ON DIFFERENT BASIS

By J. H. Dameron

FORT WORTH, Tex., Dec. 3.—Representatives of Yates Pool operators meeting in Fort Worth Friday were unanimous in their decision to continue a proration plan in the market-threatening shallow pool beyond January 1, the expiration date of the present plan, but it is possible proration after that date will be continued on a different basis.

At present the field is being produced by a co-operative allocation of present pipe line facilities. The potential production of the field is determined by hourly gauges of each well. That gauge is multiplied by 24 to get a working figure on which to base allocation of pipe line facilities.

Two new plans were brought before the representatives. One is to determine the allocation of pipe line capacity for each company by division on the basis of total proven acreage of the field and thus give each operator his proportionate share of pipe line space. The other is to combine the present method of allocation of pipe line capacity on the basis of potential production of the pool and the proven acreage plan.

Both plans, as presented in detail, will be taken to the heads of the various operating companies for their consideration. Another meeting will be held in Fort Worth December 12 and at that time it is expected either the old proration plan or a new one will be adopted and carried on beyond January 1.

At the last meeting geological reports dealing with the effect of various proposed methods of operation were read and discussed. Petroleum engineers' reports were also read and discussed. The latter have been studying conditions in the Yates Field for some time and compiled a detailed report of their findings. Those matters will also be gone into thoroughly with officials of operating companies affected and decisions made for the December 12 meeting.

Difference of Opinion

The December 1 official potential production gauge of the field gave Yates a new high in potential production when the individual hourly gauges of each well indicated the pool capable of producing 604,974 bbls. daily. However, technicians and engineers in intimate touch with Yates agreed the pool would do well to produce half that much oil if all wells were permitted to flow under usual production conditions.

Some are of the opinion the pool would do less than 300,000 bbls. daily if all wells were opened and permitted to flow wide open. It was also pointed out that many of the wells would not be permitted to flow wide open because of the danger of water drowning out the well.

Because of the manner in which the wells are gauged each has the entire pressure of the field behind it when opened for the hourly gauge. This is in addition to the accumulated pressure gathered while the well has been pinched in and that gives an abnormal flow which is not indicative of the actual performance of the wells, it was pointed out, but nevertheless a fair basis for the allocation of pipe line facilities.

Under the new proration gauge the field is now producing 44,000 bbls. daily. The pipe line capacity of the field is not

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Method of Refining Cracked Naphtha

Process Which Provides for Sulphur Treatment at Low Temperatures Conserves Constituents of High Antiknock Value

By R. A. Halloran*
Standard Oil Co. of California.

For many years the United States Government has included in its specifications for motor gasoline, the requirement that the sulphur content be not more than one-tenth of 1 per cent. A long as a large part of the fuel produced in the country consisted of straightrun gasoline no serious problem was raised by such a specification. In recent years the ratio of cracked in strightrun gasoline has been rapidly increased in order to meet the steadily growing demand for motor fuel, and as a result the problem of meeting this sulphur specification has become one of real importance.

Cracked naphthas from many sources will contain from one quarter to one per cent of sulphur. Gasoline prepared by the usual refining methods from these naphthas, although conforming to requirements for color, odor, volatility and boiling point range, will in many cases still contain from two to six-tenths of one per cent of sulphur. The question then arises: would such a gasoline be a satisfactory motor fuel for general use?

There seems to be a wide difference of opinion regarding the corrosive effects of fuels high in sulphur when used in modern automotive equipment. Two papers on this subject were read before the Petroleum Division of the American Chemical Society at its recent meeting in Detroit. The first, by S. H. Diggs, showed that with a given engine a gasoline of 0.04 per cent sulphur gave no corrosion of wrist pins, pistons, rings, etc., while with a fuel containing 0.151 per cent sulphur corrosion was quite appreciable, and water in the crankcase contained small amounts of sulphuric acid. With a fuel containing 0.485 per cent sulphur the corrosion was very serious and the crankcase water was quite acid.

In the second paper, H. C. Mougey showed that crankcase ventilation and thermostatic control of jacket water temperature tend to minimize corrosion in the motor due to high sulphur fuels. He concluded, however, that a general increase in the permissible sulphur content of motor fuel is at least not yet justifiable.

Results of Test

Results obtained in our own service testing laboratory are in good agreement with these findings. One series of tes s was carried out with gasoline containing gradually increasing amounts of sulphur up to 0.4 per cent. prepared from the same stock. The rate of accumulation of iron in the lubricating oil and hence the combined rate of wear and corrosion inside the motor was determined. We found that with a fuel containing 0.2 per cent sulphur the rate of removal of iron was 20 per cent greater than with a 0.1 per cent sulphur fuel, while with a fuel containing 0.4 per cent sulphur this rate was approximately 50 per cent greater.

These test results are not sufficiently conclusive to define clearly the permissib'e percentage of sulphur. The present limit of 0.1 per cent may be too severe. Further developments in automotive design, improvements in materials, better temperature control, more effective sealing of the combustion space against the rest of engine, etc., may justify an upward revision of the sulphur limit in the future. But the tests do prove conclusively that a limit must be imposed and that it should err rather on the safe side. Imposing such a limit may be considered then as a form of insurance on the large investment of the country—about $15,000,000,000—in automotive equipment.

Refinery Cost

Turning now to the cost of this insurance—the economic consequences of meeting this one specification. As previously indicated, the amount of acid required to remove the sulphur from cracked naphtha is in many cases large. As a result of this heavy acid treatment the losses are severe, and, to add to the difficulty, it has been found that the boiling points of the treated naphtha have been raised materially, with a consequent reduction in yield of gasoline fractions. This polymerization loss proves to be the heaviest of the two, amounting in some cases to as much as 30 per cent of the original raw gasoline.

It is apparent that the cost of such treatment is excessive by reason of the chemicals required and loss of gasoline. It is variously estimated that if all the cracked gasoline produced in the United States during 1927 were treated by conventional methods to reduce the sulphur content from 0.3 per cent to 0.1 per cent the refining cost would approximate $50,000,000.

Numerous other sources of difficulty and expense which are the direct results of the very heavy acid treatment should also be mentioned. The necessity of adding casinghead gasoline to replace the light ends lost by polymerization; handling and disposal of so large an amount of spent acid, and the corrosion of redistillation equipment by the decomposition products of alkyl-sulphates and similar compounds formed during treatment (and not removed during neutralization and washing), constitute some of the chief operating problems.

These facts might reasonably be expected to militate against the cracking of certain crudes of high sulphur content. On the other hand many crudes composed principally of cyclic hydrocarbons contain relatively large percentage of sulphur, while at the same time, cracked gasolines from such crudes are characterized by decided antidetonating properties. Obviously a refining process must be of great value which will economically reduce the sulphur content of such gasolines to the proper degree and at the same time preserve their other highly desirable properties.

These considerations were our incentive for an intensive study of the problem of treating cracked gasoline. Numerous reagents and processes were tried for their possible effect on the sulphur content of cracked naphtha. It was found that whatever the chemical classification of these sulphur compounds might be, they were remarkably stable and resistant to both chemical and physical treatment. Attempts to remove them by means of absorbents such as activated charcoal and clays, oxides, and metals at high temperatures and various treatments with many chemicals met with only indifferent success. The ideal solution would be to remove the sulphur atom alone, or at least only the molecules containing the sulphur, but no other hydrocarbons. One method of accomplishing the latter result would be by use of a solvent immissible with the hydrocarbons, but having a high solvent power for sulphur compounds.

According to the more modern theories of solubility a liquid whose molecules contain sulphur as their central atom would in all probability show the best selective solvent action for the sulphur containing hydrocarbons. The only cheap chemical available whose properties approximate our requirements is sulphuric acid. When strong sulphuric acid is used on cracked naphtha in large applications at normal temperatures, specific gravity of the naphtha is increased; the content of low boiling constituents is decreased and the whole boiling point range of the naphtha is raised, while the sulphur content is reduced only slightly. When this naphtha is redistilled the sulphur bearing bodies are concentrated in the still bottoms and a relatively low yield of specification gasoline is obtained.

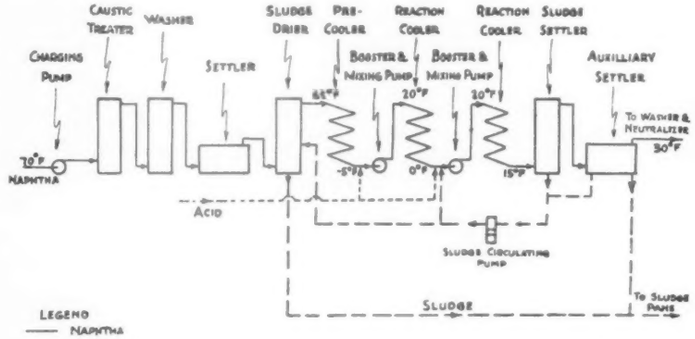

Diagram 1—Apparatus for continuous treatment of pressure naphtha at reduced temperatures.

Importance of Temperature

These effects are the marks of polymerization. In treating naphtha commercially it was observed that excessive temperatures developed at the stage where the cracked naphtha and acid were mixed. Realizing that the rate of polymerization of unsaturated hydrocarbons is accelerated by increase in temperature, some experimental treatments were carried out at low temperature with most gratifying results. The desired reduction in sulphur was obtained with a marked reduction in treating and polymerization losses. Strong sulphuric acid at low temperatures proved to be an excellent solvent for sulphur compounds of the type occuring in cracked naphtha.

The development of a continuous process on a semicommercial scale followed immediately. This plant included the refrigeration necessary to reach the desired temperature which apparently should be as low as possible consistent with thorough mixing. This is, of course, limited by the viscosities of the liquids at low temperatures.

After establishing the operating conditions in this experimental plant and demonstrating that the use of the process would result in tremendous savings, a commercial plant was constructed. The performance of this plant has fulfilled all expectations, both from an operating and economic standpoint. The acid required for treatment has been reduced over 40 per cent and the treating and polymerization losses are lower by 30 per cent and 70 per cent respectively.

Other advantages are realized from the fluid nature of the sludge produced and the absence of acid reaction products in the naphtha. These are very desirable improvements, making it possible to increase the capacity of any plant by reason of rapid sludge settling and consequent freedom from emulsion troubles during washing and neutralization.

It need hardly be pointed out that the advantages of this method of treatment become more apparent the more highly unsaturated the naphtha undergoing treatment. This fact was demonstrated by applying the method to a vapor phase naphtha containing more than 60 per cent of olefins. A well refined, sweet gasoline was produced with nominal treating losses, while the copper bowl test on the finished product was found to be comparable to that on straightrun gasoline. Anyone familiar with the gum-forming tendency of vapor phase gasoline will appreciate the significance of this.

Equipment Used

The plant which we are now operating has a capacity of 10,000 bbls. of naphtha daily. An ammonia compressor plant rated at 1,100 tons of refrigeration furnishes the cooling required. The accompanying flow diagram shows the essential steps in this process.

The crude naphtha is given a preliminary caustic treatment and, after washing and settling, is finally dried by contact with spent acid which is returned to this part of the system from the sludge settler. Drying is necessary to remove water which would otherwise freeze in the cooling coils during the subsequent operation.

After settling and removal of the acid the naphtha is cooled to a temperature approximately 25-30 degrees Fahrenheit below the maximum temperature desired for the treatment, that is, to about 5 degrees below zero Fahrenheit. This cooling may be done in one or more stages and is carried out in specially designed coolers, the naphtha flowing through coils which are surrounded by ammonia. These coolers are termed precoolers to distinguish them from the reaction coolers which follow the acid treatment.

From the precoolers, the naphtha passes to the acid mixers where the acid is applied in two or more stages. For convenience, centrifugal pumps are used which serve both as mixers and boosters. The application of the acid in several stages permits of better temperature control and provides for the absorption of some of the heat of reaction in coolers after each mixing pump. The distribution of acid between the mixers is such that the temperature is the same after each application, this temperature being the desired maximum. Each application of acid is followed by another cooling of naphtha and sludge in a reaction cooler, and the mixed naphtha and sludge then pass to sludge settlers where the latter is removed, and finally to water washers and caustic treaters for the neutralization process. The water washing and neutralization steps take place at ordinary temperatures.

The treated naphtha is rerun for test gasoline, using fire and steam rather than the conventional steam still, thus

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*Before American Petroleum Institute, Chicago.

Evaluation of Wire Rope Casing Lines

Method Developed by Large California Company to Determine Relative Costs and Services

By Hallam H. Anderson*
Chief Engineer, Production Department, Shell Co. of California.

The mythical deed of Prometheus to bring light to the groping earth, and the task of Hercules to release him, both fade into insignificance before the task of the American Petroleum Institute's Standardization Committee to release wire rope specifications which will bring light to the groping wire rope users. These users cannot be satisfied with a light which will show them how to determine if a rope is good before it is run—they will need also another light which will show them how to determine if the rope was good after it is worn out. The engineer asks: "How can we determine if this brand of wire rope will give good service?" The manager asks: "How much service did this brand of wire rope give per dollar invested?" While the formal specifications are engaged to bring light on the first question, the annual papers on usage should be engaged to develop a method to answer the second.

In the usage paper presented at Tulsa last December, L. B. Little directed the attention of wire rope users to the need for some comprehensive method to interpret field service data. The purpose of this paper is to describe a method developed recently by a large California operating company to determine the relative costs and services rendered by its wire rope casing lines. In consideration of the great volume of exact test work performed by the committee, this method may have a paucity of scientific merit. Possibly its only claim is that it may serve as a practical basis to compare approximately in dollars and cents the service costs of the different wire rope casing lines, but, if this can be done to the satisfaction of the operator and with reasonable fairness to the several competitive brands of wire rope compared, the method represents a step forward.

Selections and Sample Tests

For some time the drilling organizations have realized the need for better wire rope casing lines, and possibly too often the selection of same has been influenced by unproven claims of manufacturers that an improved article is available. Manufacturers with several construction types to offer have been free to prescribe that one combination of circumstances demands one type of rope and another condition demands a different type. Yet often two types will be sent out on one delivery with no designation as to which rope is of which type. With a selection of trade names derived principally from the rainbow, the uninitiated user usually is ignorant of even the general distinguishing characteristics of the ropes received.

In the attempt to bring order out of an unsatisfactory condition, it was considered inadvisable to limit in any way the choice of lines by the ultimate users (the drilling department) until a fund of definite comparative identification, laboratory and service data could be obtained. Therefore, instead of specifying "A.P.I. wire rope," each wire rope purchase order contained the following clauses:

"This rope is to equal or exceed in quality the A.P.I. specifications for wire rope (Standards 9-A as amended by Circular S-56), for Grade ——.

"The outer end of each line is to be doubled-served to allow us to cut off a 5-foot sample for test.

"Please furnish us with a copy of your own A.P.I. test on each line, identifying same by the line number as marked on the delivered reel, our order number as given hereon, and the district to which the line is delivered."

This last paragraph afforded means to study the psychology and co-operation of the manufacturers. The majority of them complied fully and willingly, some not so willingly, and one explained that he did not sell his rope to meet A.P.I. specifications and he therefore refused to give out his own laboratory tests on it.

Upon receipt of the lines in the field storehouses, the 5-foot samples were cut off and forwarded to a central point. Here certain of them were selected and sent to a local commercial laboratory for A.P.I. test. All samples were sent of the lines of the unobliging manufacturer, and a sufficient number of other samples were sent to check the available factory test records.

Construction and Physical Properties

What a revelation these test records effected! Among the one hundred and fifty "1-inch casing lines" purchased during 10 months from eight manufacturers there were found to be seven types of strand construction, four types of core construction and several grades of material in 17 identifiable combinations. Certainly the need for a method to determine which of these ropes gave the cheapest service was imperative.

In Figure 1 are shown several types of strand and core construction found in these ropes. In as much as they were purchased only from eight manufacturers it is quite probable that several other ingenuous combinations exist. Because of the confusing ambiguity of the general term "6/19", the various constructions in Figure 1 are designated by the actual numbers of wires in the strands, which range from 19 to 37. It is too early to draw conclusions as to which types of strand construction give best service in heavy rotary drilling work, but there is evidence to support a tentative opinion that types 2, 3 and 4 are best adapted for these conditions. Most of the ropes are made with "all-manila" cores, but some of the standard brands have been furnished specially with combination "wire-and-manila" cores to prevent a tendency shown by certain of the "all-manila" cores to stretch or break and allow the rope to attenuate.

The A.P.I. tests for tensile strengths, torsions, and bends were received from the manufacturers and the local laboratory. Considerable variations in physical properties of different reels of the same brand of rope were found, such as the following:

Casing Line No.	Identity	Average Tensiles Inside	Average Tensiles Outside	Average Torsions Inside	Average Torsions Outside	Average Bends Inside	Average Bends Outside
11	C-2 Plow	221,900	217,200	33	30	55	9
6	C-2 Plow	264,500	243,500	31	31	54	9
26	F-3 Imp. Plow	241,300	242,600	36	36	14	13
20	F-3 Imp. Plow	269,400	266,600	31	35	11	11

It is as yet too early to draw definite conclusions as to the practicability of the A.P.I. tests to establish the relative value of a line prior to its use, though the comparatively meager fund of available field service data does indicate several outstanding parallels of cause and effect which involve largely the factors of physical properties of the materials.

Evaluation of Rope Service

No matter how careful the efforts or how exacting the procedure developed to estimate the merit of a wire rope before it is run, it is necessary to develop some method to evaluate the service of the rope after it is worn out. The evaluation of labor service or of machine operation service usually is based upon the cost of work performed, and it is quite natural that "work"—the product of force or weight times distance (the true physical meaning)—should present itself as a unit capable of being priced. The most logical basis for comparison should be "the cost per unit of work performed."

The function of a casing line is to transmit "work" to hoist and lower weights. In both operations a certain amount of work is transmitted. Though the work done on the pipe, elevators, hook and block during the lowering operation is algebraically negative, the work transmitted by the wire line to resist their free-fall is approximately the same as that transmitted to raise them an equal distance. The above reasoning suggested the practical plan to measure and sum up in simple units all of the work transmitted to raise and lower the pipe, elevators, hook and block, etc., by each line during its entire period of service, and to express this work in "ton-miles" as a unit of convenient size.

Many Factors Influence Service

To calculate with scientific accuracy the exact amount of work performed by a casing line is an almost impossible task. There are so many factors which may influence the result that one is lost in a bewildering maze of variables. Some of these latter which have been suggested by critics of the present-described method are:

1. Flotation of drill-pipe and mud-laden fluid.
2. Frictional drag of pipe on walls of hole.
3. Weight of pipe lifted.
4. Depth from which pipe is lifted.
5. Length of line purchased.
6. Number of lines strung in blocks.
7. Line speed on fast sheave.
8. Diameter and length of drum.
9. Diameter and arrangement of block sheaves and material of same.
10. Temperature and humidity.
11. Type of prime mover, and horsepower of same.
12. District in which well is drilled.
13. Drillers' eccentricities.
14. Three o'clock fag, etc., etc.

It is conceded that at least two of the above-named factors may influence the results materially, but it appears useless to attempt to study their various effects without the selection of some fundamental unit as a basis for comparison. Irrespective of other considerations, the lines will be discarded by the drillers when in their opinions they become dangerously worn, and there is little use to split hairs on methods of measurement when the largest factor involved is human judgment. However, it is comparatively simple to determine approximately the work in "ton-miles" transmitted by the line to raise and lower the pipe, elevators, blocks and hook if the pipe is assumed to hang free in the hole. This determination effects the exclusion of the many confusing variables which cannot all at one time be allowed for. Simultaneously, other pertinent data can be obtained concerning the other influencing factors, and an attempt may be made later to determine how they cause the total work transmitted by individual lines to vary from the average total service rendered by other lines of the same brand.

How Total Service is Determined

Instruments which will sum up the total ton-miles of work transmitted by a line are not readily available. However, recording weight indicators can be used to record how often the drill strings, etc., are pulled and lowered. They usually are attached to the dead ends of the casing lines to indicate the tension in the lines at all times. These tensions can be reported to the driller by means of indicating pressure gauges placed conveniently, and they can be recorded for later consideration by recording pressure gauges placed where they will be free from vibration. The use of 24-hour charts are most convenient, and they assure the daily inspection of the gauges.

Aside from showing the tension on the casing line at all times, these charts permit one to determine how many times each day the drill pipe was pulled out of and run into the hole. Common parlance is to call one "pull out" and the subsequent "run in" a "round trip." The records show how many round trips of the pipe were made and at what times. From the time at which these occurred, the corresponding depths of the hole can be determined by reference to the driller's log. The weights handled can be quite accurately determined from the calibration charts furnished with each instrument, but if the depth of the hole, the weight per foot of the drill pipe, and the weight of the elevators, hook and blocks are known, the approximate work transmitted by the line can be determined directly from a simple chart with sufficient accuracy for the problem at hand.

Although every progressive operator should appreciate that the installation of a recording weight indicator in each rig is an excellent investment, this on account of the fund of valuable general information which it gives to the drillers and to the management concerning the drilling operation, its use is not essential to the successful application of the present-described method to evaluate wire line service costs. Although probably not as reliable, to require the drillers to write in on their daily drilling logs the number of round trips made and the depth at which each was made is a satisfactory plan to secure the simple fundamental data necessary for the calculation of work in ton-miles transmitted by the casing lines.

A large chart was prepared to simplify the calculation of the amount of work in "ton-miles" transmitted by the casing line during each round trip to "pull out" and "run in" the string of drill pipe, which is assumed to be suspended free in the hole.

The chart and formula show the work transmitted during each round trip only. From the number of round trips made each day and the depths at which each occurred, the total work transmitted each day may be calculated. A brief example is given below of the calculation of the ton-miles of service rendered by a casing line over a 10-day period.

Drill pipe used: 6⅝-inch, 25.2-pound A.P.I.

Date new line put on: February 8.

Calculation of work in ton-miles.

Date 1927	No. of Round Trips	Average Depth-Feet	Ton-miles per Round Trip	Ton-miles for Day
February 8	4½	875	3.7	16.6
February 9	2½	895	3.8	9.5
February 10	3½	975	4.3	15.0
February 11	3	1,065	5.0	15.0
February 12	5½	1,160	5.7	31.3
February 13	2½	1,280	6.6	16.5
February 14	1	1,430	8.0	8.0
February 15	3	1,490	8.4	25.2
February 16	0	1,500	8.5	0.0
February 17	2	1,525	8.8	17.6
Total Ton-miles of service for 10-day period				154.7

This line was not worn out after 10 days of service, but the example is curtailed for the sake of brevity. The last

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*Before American Petroleum Institute, Chicago.

Slight Decrease in Refinery Runs

Less Than Hundred Plants Now Operating in Mid-Continent Area. Three Shut Down. Change Names of Three

By W. T. Ziegenhain

A decrease in the Mid-Continent refinery crude runs of 9,190 bbls. daily for December reflects the seasonal decline in the consumption of refined oils and the generally unfavorable market conditions. Although crude prices are low, there is little inducement at the present time to maintain crude runs and to store the surplus refined oil production. The December runs have totaled 417,455 bbls. daily compared to 426,645 bbls. last month, and 403,450 bbls. a year ago.

The decrease in runs is general throughout the various states included in the Mid-Continent with the exception of northern Louisiana, where runs have been increased slightly. Kansas led in the decrease, the amount being 5,200 bbls. When compared to a year ago, the present December runs represents an increase of 14,000 bbls., the bulk of which is in the Oklahoma plants. In fact, the increase in the Oklahoma runs amounts to 14,495 bbls. and accounts for the total as the increased runs in north central Texas and Kansas are equalized by the decreased runs in North Louisiana and Arkansas.

By December 1 the total number of operating plants in the Mid-Continent was decreased below the 100 mark when 3 of the 102 plants operating a month ago closed down. These included the 2,500-bbl. plant of the Texas Pacific Coal & Oil Co. at Wynnewood, Okla., the 1,000-bbl. refinery operated by the Swastika Refining Co., at Muenster, Tex., and the Primtex Refining Co.'s 2,500-bbl. plant at Grand Prairie, Tex. No plants, previously shut down, resumed operations during the month. Likewise, there was no change in the capacity of the refineries resulting from new construction work.

New Names

Three plants are now operating under new names. The purchase of the Alamo Refining Co.'s plant at Isom, Tex., by the Phillips Petroleum Co. has caused the name to be changed to that of the purchasing company. The merging of the Cameron Refining Co. interests and the Wirt Franklin Petroleum Corp. in which the name of the latter was given to the refinery located at Ardmore, Okla., is another important change. The third change in name is that of the Newark Refining Co. plant at El Dorado, Ark., to the Macmillan Petroleum Products Co. This change was made when the properties of Macmillan, Fehlman & Oliver, Inc., were taken over to be operated by the Macmillan Petroleum Products Co.

Oklahoma

Practically no material changes were made in the operations of the Oklahoma plants. The crude runs remained about equal to those of last month in almost every plant, the only exception being the shutting down of the Texas Pacific Coal & Oil Co.'s plant at Wynnewood. This plant was shut down early in November and plans have been made to discontinue its operation for a period of six months. The other plant of that company, located at Fort Worth, Tex., will supply a portion of the regular trade as the crude supply is stored.

North Central Texas

There was no general change made in the operations of the North Central Texas refineries, slightly decreased crude runs at some plants being equalized by the higher crude runs at other plants. The Kent-Middleton Refining Co.'s plants at Angus and Minerva have had to decrease runs slightly because of a shortage of crude. This decrease together with the shutting down of the Primtex refinery and the Swastika refinery previously discussed accounts for the small decrease in the crude runs in this territory.

RUNS TO STILLS IN MID-CONTINENT REFINERIES

	Bbls. Daily
1925	
May 1	398,940
June 1	422,050
July 1	440,350
August 1	427,382
September 1	407,690
October 1	415,575
November 1	383,225
December 1	375,979
1926	
January 1	390,200
February 1	385,845
March 1	365,990
April 1	368,210
May 1	391,355
June 1	415,450
July 1	410,070
August 1	407,475
September 1	419,995
October 1	408,975
November 1	417,375
December 1	403,450
1927	
January 1	403,625
February 1	418,595
March 1	418,920
April 1	401,860
May 1	407,355
June 1	426,170
July 1	428,075
August 1	457,800
September 1	422,150
October 1	420,955
November 1	426,645
December 1	417,455

Kansas

Kansas refiners showed a decrease in runs amounting to 5,200 bbls. and most of this decrease came as a general decrease in all plants. Aside from this change in crude runs the operations continued the same, the only exception being in the starting up of the cracking plant at the Golden Rule refinery at Wichita, which had previously been shut down for three months.

Arkansas

Lion Oil Refining Co., operating at part capacity because of an explosion and fire at its plant several weeks ago is getting back into shape and with four pressure stills in operation December 1, was expecting to have all repairs completed and the plant running 100 per cent by December 20. Root Refineries Co. plant also was the victim of an accident during November which put two cracking units out of commission. One of these has been restored and the other is expected to be put in operation January 1. The Macmillan Petroleum Products Co. also is operating at less than capacity but expects to run larger volume of crude during December when repairs and extensions to plant now under way are completed within the next two or three weeks. These consist practically of the entire rebuilding of the plant with the addition of more pipe still and tower work capacity which will raise total daily capacity from 1,400-1,500 bbls. to 2,000 bbls.

Increased runs in the several instances are accounted for by greater production of antiknock gasolines upon which Arkansas refiners in particular have been laying more stress during the last few weeks.

MID-CONTINENT REFINERY OPERATIONS

TABLE 1

(Based on Operations December 1, 1927 and November 1, 1927)

	*No. of Plants Dec. 1	Crude Capacity Bbls.	Crack Plants Capacity Bbls.	Plants Oper'g Dec. 1	Runs to Stills Dec. 1	Plants Oper'g Nov. 1	Runs to Stills Nov. 1	Daily Dec. Dec. 1
Oklahoma	47	275,700	80,100	41	180,905	42	183,125	2,220
N. C. Texas	39	174,200	43,800	31	97,250	33	99,950	2,700
†Kansas	20	133,500	61,600	16	84,700	16	89,900	5,200
North Louisiana	4	44,300	19,300	4	36,500	4	35,400	‡1,100
Arkansas	9	32,300	30,300	7	18,100	7	18,270	170
Total	119	660,000	235,100	99	417,455	102	426,645	9,190

*Does not include plants shut down one year or more.
†Increase.
‡Includes two Missouri plants.

TABLE 2

(Based on Operations December 1, 1927 and December 1, 1926)

	No. of Plants Dec.1, 1926	Crude Capacity Dec. 1, 1926	Plants Operating Dec. 1, 1926	Runs to Stills Dec. 1, 1926	Daily Inc. Dec. 1, 1927
Oklahoma	51	263,500	44	166,410	14,495
N. C. Texas	39	172,400	32	89,685	7,565
†Kansas	19	123,000	18	84,070	630
No. Louisiana	5	50,000	4	42,800	†6,300
Arkansas	10	32,000	8	20,485	†2,385
Total	124	640,900	106	403,450	14,005

*Does not include plants shut down one year or more.
†Decrease.
‡Includes one Missouri plant.

REFINERY OPERATIONS IN OKLAHOMA

(Plants which have been in operation during the past year)

Name and Location—	Daily Capacity	Runs Dec. 1	Runs Nov. 1
Anderson-Prichard Oil Corp., Cyril	2,500	1,800	1,800
Barnsdall Refineries, Inc., Barnsdall	6,000	3,500	3,000
Barnsdall Refineries, Inc., Okmulgee	10,000	6,600	6,500
Bell Oil & Gas Co., Grandfield	4,500	2,100	2,000
Bolene Refining Co., Enid	5,000	3,000	3,000
Canfield Refining Co., Yale	400	75	75
Champlin Refining Co., Enid	16,000	11,500	11,500
Continental Oil Co., Sapulpa	10,000	2,500	2,500
Cushing Refining & Gasoline Co., Blackwell	1,500	1,500	1,000
Cushing Refining & Gasoline Co., Cushing	3,500	1,500	1,500
Empire Oil & Refining Co., Cushing	5,000	4,700	4,700
Empire Oil & Refining Co., Okmulgee	3,000	3,000	3,000
Empire Oil & Refining Co., Ponca City	7,500	7,500	7,500
Garber Refineries, Inc., Garber	3,500	3,000	3,500
Gilmer Oil Co., Ringling	1,500	Shut down	Shut down
Globe Oil & Refining Co., Blackwell	5,000	5,000	5,000
Illinois Oil Co., Cushing	3,000	1,600	2,000
Imperial Refining Co., Ardmore	5,000	Shut down	Shut down
Independent Oil & Gas Co., Okmulgee	4,000	2,700	2,700
Interocean Refining Co., Bristow	4,000	1,000	900
Johnson Oil Refining Co., Cleveland	6,000	5,500	5,500
Marland Refining Co., Ponca City	28,000	18,000	18,000
Mid-Continent Petroleum Corp., West Tulsa	40,000	25,000	25,000
Oil State Refining Co., Enid	2,000	Shut down	Shut down
Oil State Refining Co., Allen	800	500	500
Peppers Gasoline Co., Covington	1,000	700	700
Pierce Oil Corp., Sand Springs	12,000	6,000	6,400
Producers Oil Co., Bristow	2,500	Shut down	Shut down
Producers & Refiners Corp., West Tulsa	6,000	3,600	3,800
Pure Oil Co., Ardmore	5,000	2,000	2,000
Pure Oil Co., Muskogee	8,000	7,000	7,000
Riley Petroleum Co., Bristow	1,000	300	300
Rock Island Refining Co., Beckett	2,500	1,400	1,400
Sayre Oil & Refining Co., Sayre	500	Shut down	Shut down
Shaffer Oil & Refining Co., Cushing	10,000	10,000	10,000
Sun Oil Co., Yale	4,500	4,500	4,500
Sinclair Refining Co., Muskogee	1,000	800	800
The Texas Company, West Tulsa	12,000	12,000	12,000
Texas Pacific Coal & Oil Co., Wynnewood	2,500	Shut down	1,600
Tidal Refining Co., Drumright	10,000	8,000	8,500
Transcontinental Oil Co., Boynton	2,500	1,800	1,500
Transcontinental Oil Co., Bristow	5,000	3,000	3,500
Tonkawa Petroleum Co., Tonkawa	2,500	700	750
Western Oil Corp., Beckett	2,000	1,500	1,400
White Oak Refining Co., Allen	2,000	1,725	1,800
Wirt Franklin Petroleum Corp., Ardmore	4,000	3,255	3,600
Yale Oil Corp., Yale	1,500	1,000	1,000
Total	275,700	180,905	183,125

REFINERY OPERATIONS IN NORTH LOUISIANA

(Plants which have been in operation during the past year)

Name and Location—	Daily Capacity	Runs Dec. 1	Runs Nov. 1
Crystal Oil Refining Corp., Shreveport	13,000	9,700	9,000
Louisiana Oil Refining Corp., Shreveport, Bossier	20,000	16,000	15,000
Shreveport Producing & Refining Co., Shreveport	5,500	5,200	5,800
*The Texas Company, Shreveport	5,800	5,600	5,600
Total	44,300	36,500	35,400

*Topping.

REFINERY OPERATIONS IN ARKANSAS

(Plants which have been in operation during the past year)

Name and Location—	Daily Capacity	Runs Dec. 1	Runs Nov. 1
Henry H. Cross Co., Smackover	4,000	3,700	3,900
Houston Oil Co., Camden	3,000	Shut down	Shut down
Kettle Creek Refining Co., Pearson	6,000	2,000	2,000
Lion Oil & Refining Co., El Dorado	12,000	5,000	6,000
Macmillan Petroleum Products Co., El Dorado	1,800	1,000	500
Ouachita Valley Refining Co., El Dorado	1,000	1,000	970
Root Refineries, El Dorado	2,500	2,300	3,300
Simms Oil Co., Smackover	1,000	2,500	1,600
E. M. Tulle, El Dorado	1,000	Shut down	Shut down
Total	32,300	18,100	18,270

REFINERY OPERATIONS IN KANSAS

(Plants which have been in operation during the past year)

Name and Location—	Daily Capacity	Runs Dec. 1	Runs Nov. 1
Arkansas City Refining Co., Arkansas City	8,000	Shut down	Shut down
Barnsdall Refineries, Inc., Wichita	5,000	2,500	3,000
Derby Oil Co., Wichita	5,000	3,500	3,500
Derby Oil Co., Russell	2,500	Shut down	Shut down
Eldorado Refining Co., Eldorado	3,500	2,200	2,200
Golden Rule Refining Co., Wichita	1,000	1,000	800
Kanotex Refining Co., Arkansas City	10,000	4,000	5,000
Manhattan Oil Co., Kansas City	7,000	4,000	5,000
Miller Petroleum Co., Humboldt	2,000	Shut down	Shut down
National Refining Co., Coffeyville	6,500	6,000	6,500
Peerless Oil Refining Co., Chanute	3,000	2,000	2,500
Roxana Petroleum Corp., Arkansas City	20,000	16,000	16,500
Sinclair Refining Co., Coffeyville	10,000	9,500	9,500
Sinclair Refining Co., Argentine	8,000	8,000	8,000
Skelly Oil Co., Eldorado	15,000	9,500	10,000

(Continued on Page 152)

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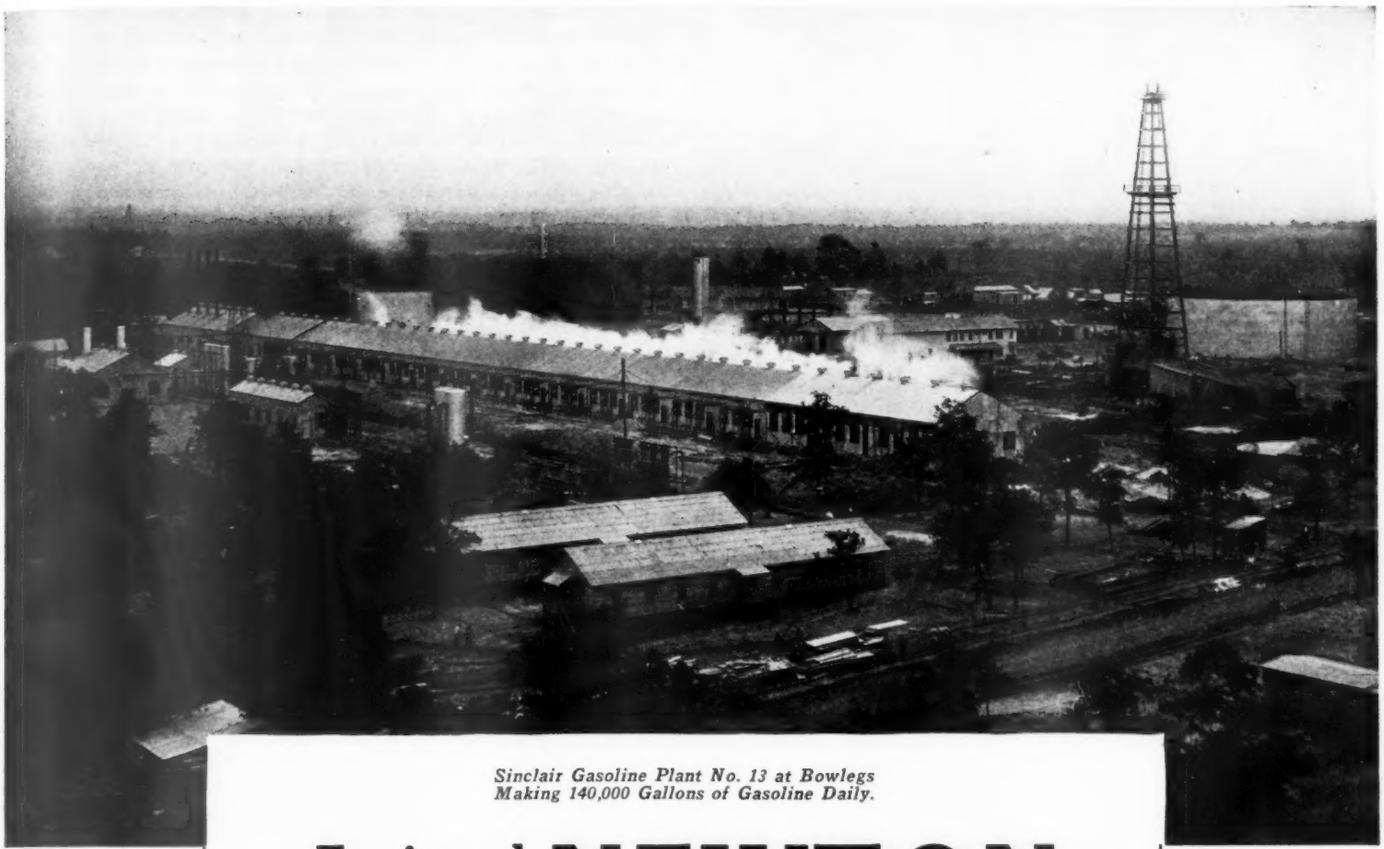

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MEMBER AUDIT BUREAU OF CIRCULATIONS

THE INSTITUTE ACTS

The Chicago meeting of the American Petroleum Institute will be notable for the constructive work accomplished or begun. It was marked from start to finish by a directness and definiteness that has not always characterized its deliberations.

The Institute and the industry it so well represents are to be congratulated upon the program of practical worth presented at the Chicago sessions and upon the progress made.

In several instances the Board of Directors departed from traditional attitudes and broke new and promising ground. This was so in the adoption of Mr. D. E. Buchanan's resolution providing for the appointment of a committee to study the feasibility of inaugurating a plan for co-operative research for the development of new products, new uses and new markets along the lines of Mr. Buchanan's speech at Breckenridge, Tex., published in The Oil and Gas Journal of November 3.

This is the first time the Institute has looked favorably upon the suggestion of co-operative research of this nature, the feeling in the past having been that companies doing that work were entitled to any rewards accruing. The larger benefits possible to the whole industry through joint action are now recognized.

No less positive was the resolution adopted by the Board of Directors declaring full faith in the ability of the oil industry to meet the growing demand for oil for domestic heating purposes, a heating service which, like the gasoline automobile, will establish a new standard of American home life and fix a level of comfort and convenience never before attained and at a price well below the limit of its economic value for that use.

This is not a competition with coal, any more than the gasoline motor was a competitor of the horse and buggy. It is a superior service for which the American people have shown they are always willing to pay a proper price.

Properly developed, as the proposal for co-operation with the oil heating institute and this public assurance of an unfailing supply of burning oil promises, the demand for oil for domestic heating should go a long way towards solving the overproduction problem by providing a corresponding consumption for petroleum products.

Chief interest, of course, centers in the presentation and adoption of the report of the Committee on Agreements of which Judge Amos L. Beaty was chairman, and Messrs. Veasey, Ames, Townes, Byles and Proctor were members.

The report of the committee stated the belief that the oil producing states, especially at this time, California, Oklahoma and Texas, should pass a simple enactment "that it shall be lawful for operators or others at interest to make agreements whereby the production of crude petroleum is diminished or postponed during periods of overproduction and actual or economic waste, and justification of such agreements shall be deemed conclusive when and so long as the production of crude in the pool or pools affected exceeds available transportation facilities, or when and so long as, of crude petroleum, the production in the United States, together with imports, exceeds consumption in and exports from the United States."

The committee further suggests that the Federal Congress enact similarly that "it shall be lawful for operators or others at interest to make agreements whereby the production of crude petroleum which moves or is to move in commerce as defined by the Act of October 15, 1914, is diminished or postponed during periods of overproduction and actual or economic waste."

Here is a definite platform upon which the entire industry can get together. It translates into action the arguments presented in "The Oil Industry's Answer Today," published in The Oil and Gas Journal last week, that oil men, if permitted to do so, can solve the problem of overproduction and conservation by co-operation within the industry without interference or compulsion.

The enactment of such legislation by the states and Congress would remove from the Government the reproach of preaching conservation and at the same moment prohibiting any attempt to promote the conservation of oil by the only practicable means possible.

At the same time the Beaty committee, mindful of the admission by the Oil Board that the Government itself must plead guilty to failure in conserving the oil resources it controls, recommended that Congress be requested to modify the present statutes governing the leasing of Indian lands and the public domain for oil and gas so as to give the Secretary of the Interior discretion to relax drilling obligations during periods of overproduction and to withhold Indian lands at such times.

President Coolidge in his message to Congress on the same day, after referring approvingly to the formation of a committee of lawyers, engineers and public officers to consider conservation legislation, recommended emphatically that discretionary authority should be granted by Congress in regard to the leasing and drilling of Osage lands.

Congress can not consistently criticize the oil industry so long as its own failure to protect the oil controlled by the Government on Indian lands remains unremedied, despite repeated admonitions.

The report of the Marland Committee on Conservation of Gas in Oil Production is described as probably the most radically forward step ever presented to the directors. It is designed to encourage co-operative development of oil pools wherever found with diversified ownerships, supported by state legislation to permit such co-operative development "where it is necessary for the protection of the correlative rights of owners and conservation."

Apart from these outstanding developments remarkable progress in solving problems confronting their particular branches of the industry was shown by the reports of the standardization committees, and committees on uniform accounting, fire prevention, oil pollution, petroleum products and lubricants, automotive transportation, public relations, tank cars, calibration, etc.

The executive staff of the Institute is entitled to much praise for the arrangements and the splendid program, the papers and discussions being in every case of exceptional interest and value.

The interest shown in the recommendations for the creation of new divisions of the Institute on development and production engineering and refining technology, propositions that have been earnestly canvassed, was a notable feature of the sessions.

Never in its eight years has the American Petroleum Institute so energetically and constructively acquitted itself as the parliament of petroleum as at this meeting.

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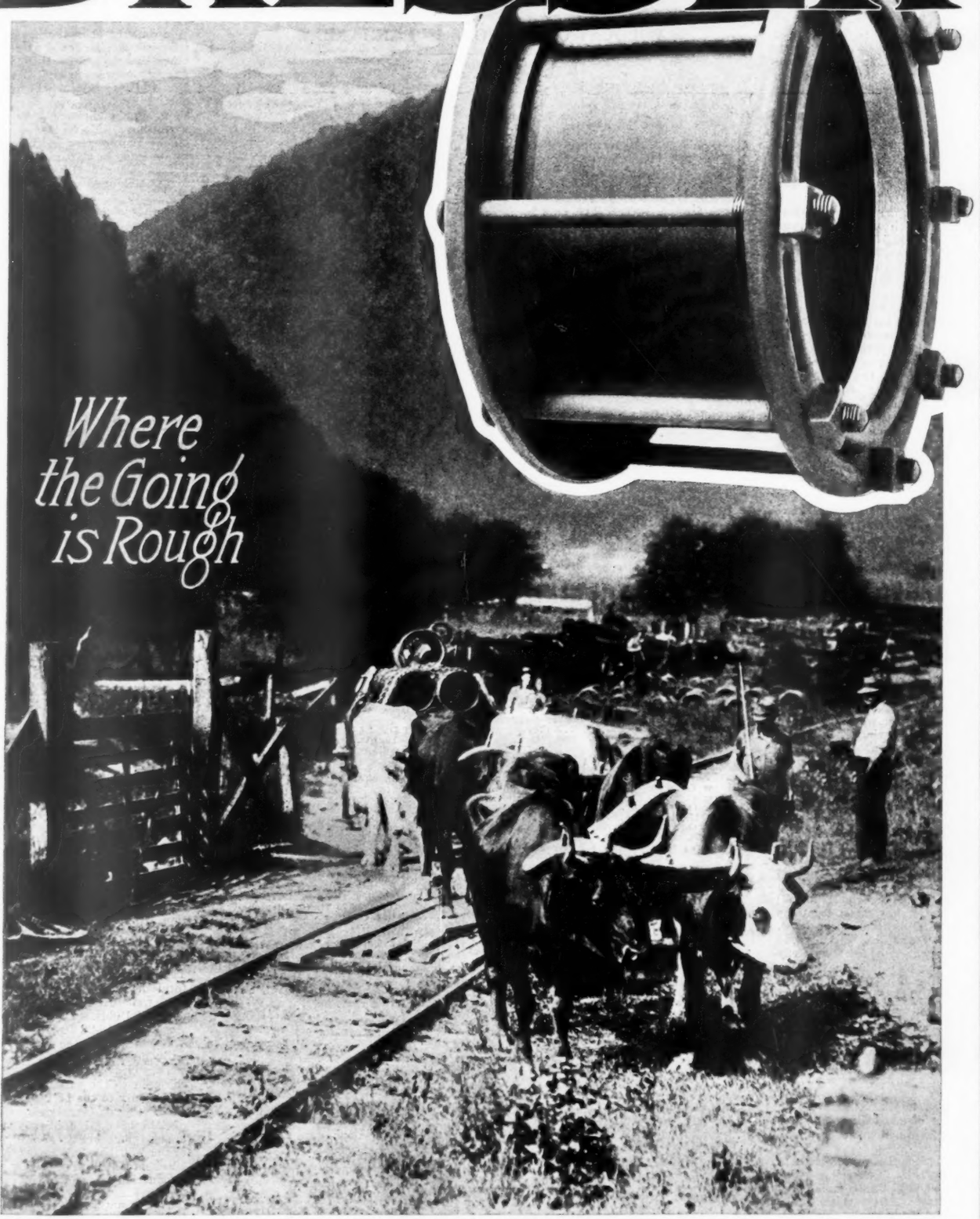

COUPLINGS DOMINATE

Open Another Pool in Gray County

Producing Horizon in Wildcat Believed to Correlate With First Pay in Bowers Pool, 14 Miles North

By James H. Dameron
Staff Correspondent, Texas Panhandle

AMARILLO, Tex., Dec. 5.—Opening of another pool in Gray County is indicated in the completion of The Texas Company's No. 1-A Chapman, NE NW NW Section 51, Block 25, H. & G. N. R. R. Survey, for a 600-bbl. well. The well topped the granite wash at 2,818 feet and was drilled to 2,820 feet. It drilled itself 3 feet deeper to a total depth of 2,823 feet and made 590 bbls. of 42.5 gravity oil the first 24 hours. The well is now shut in pending the erection of storage.

It is believed the producing horizon in the wildcat correlates with the first pay in the Bowers Pool which is about 14 miles west and a little north. The second pay in the Bowers area is the most prolific and lies approximately 150 feet beneath the first pay. It is believed that deeper drilling in the newly discovered territory will tap a more prolific pay.

Nearest production to the wildcat is the Amagray Oil Co.'s No. 1 A. Chapman, SW NW SW Section 9, Block 26, which is about 4 miles due north and on the north side of the North Fork Creek. That well swabbed and flowed 211 bbls. the first 24 hours. It had been drilled to 2,786 feet where water showed. The hole was plugged back to 2,730 feet. Granite wash was topped at 2,280 feet; the first show was found at 2,579, another at 2,610-15 and at 2,623-25 feet. The best showing was encountered at 2,660-65 feet and at 2,718-25 feet.

Bowers Pool

Developments in the Bowers Pool of Gray County, the most active area in the Panhandle, moved rapidly at the close of the week. Phillips Petroleum Co. is reported to be getting a good well in its No. 1 Jackson, NE cor. SW SW Section 88, Block B-2. According to unconfirmed reports from the field the well hit the pay at 2,940 feet and is flowing strong. No estimated gauge was given.

Danciger Oil & Refining Co.'s No. 3 Jackson averaged 3,140 bbls. daily during the past week to increase 2,215 bbls. in daily average production. The same company completed No. 2 Jackson in granite wash at 2,960-85 feet making 2,500 bbls. of 44.6 gravity oil the first 24 hours. No. 2 Jackson is the north offset to the Delaney well in the Bowers Pool which is making around 5,000 bbls. daily and which has been producing richly for 50 days. Danciger Co. has made locations for three more wells on its Jackson lease, being No. 6, No. 7 and No. 8. Only one other completion was reported from Gray County during the week and that was a 20-bbl. well on the Empire Gas & Fuel Co.'s B. J. George lease.

Another big well was reported from the McIlroy Pool in Hutchinson County when White & Lane's No. 1 Ellis Cockrell B, flowed 2,000 bbls. the first 24 hours from one foot of pay topped at 2,980 feet. The well is now producing 1,500 bbls. daily and is to be drilled deeper. No. 2 on the same lease picked up 3,000,000 feet of gas in lime at 2,640 to 2,930 feet. Six-inch casing is being run to 2,930 feet.

In the same pool Roxana Petroleum Corp.'s No. 2 Ellis Cockrell, which showed for a good well, was completed as a 50-bbl. well after a 200-quart shot. The Texas Company, drilling in the northeastern part of the pool for deep production, abandoned No. 1 Ellis Cockrell at 4,512 feet as a duster.

Deep Failure

Another deep failure in the Panhandle was Phillips Petroleum Co.'s No. 12 J. A. Whittenburg (Elra). That test has been temporarily abandoned at 4,445 feet. The other completion in Hutchinson County during the week was R. J. W. Oil Co.'s No. 1 E. Cockrell, which averaged 50 bbls. daily for a week after a 900-quart shot. Panhandle's completion report was wound up with a 35,000,000-foot gas well on the Empire Gas & Fuel Co.'s Burnett estate lease in Carson County.

Last Chance Oil Co.'s No. 1 J. W. McConnell in Carson County was drilled deeper to 3,290 feet and averaged 165 bbls. per day. The pay was topped at 3,250 feet and the well was making 100 bbls. per day from 3,250-87 feet. It is being cleaned out now and will be drilled deeper during the current week.

Wildcatting in the Panhandle has been quiet for months but shut-down tests in Hansford, Hockley and Lipscomb County have resumed drilling. Little change was noted in the other rank wildcat areas of the Panhandle.

Contract has been made by Young and Bailey for a 1,000-foot test in the "grass roots" country in Hale County. The test will probably be located in Section 36, Block B, R. M. Thompson Survey, about 12 miles west of Hale Center. It will be near the tests that found oil showings around 400 feet last summer but failed to materialize into anything of merit.

Only four new locations were announced for the Panhandle last week. Three were in Gray County and one was in Hutchinson County. Completions by counties were as follows:—

PANHANDLE DISTRICT

Hutchinson County

Phillips Petroleum Co.'s No. 12 J. A. Whittenburg (Elra) temporarily abandoned at 4,445 feet. R. J. W. Oil Co.'s No. 1 E. Cockrell, total depth 3,048 feet, shot with 900 quarts at 2,838-3,048 feet in lime, flowed 200 bbls. first 17 hours and averaged 50 bbls. daily for week. Roxana Oil Co.'s No. 2 E. Cockrell, total depth 3,045 feet, shot with 300 quarts at 2,950-3,045 feet in lime, initial production 50 bbls. The Texas Company's No. 1 E. Cockrell, dry and abandoned at 4,512 feet.

Carson County

Empire Gas & Fuel Co.'s No. 8 Burnett estate, 35,000,000 gas from 2,385-2,535 feet.

Gray County

Danciger Oil & Refining Co. and others' No. 2 W. Jackson, total depth 2,985 feet, set perforated 6-inch at 2,926 feet, pay in granite wash from 2,960-85 feet, made 2,500 bbls. 44.6 gravity initial production. Empire Gas & Fuel Co.'s No. 1 B. J. George, total depth 3,329 feet, shot with 60 quarts at 3,320-29 feet, flowed and swabbed 20 bbls. daily for week. The Texas Company's No. 1 A. Chapman, total depth 2,823 feet, drilling at 2,820 feet, well drilled itself 3 feet deeper and made 590 bbls. 42.5 gravity from granite wash at 2,818-23 feet.

Production in the Panhandle showed a daily average gain of 4,530 bbls. last week. Gray County was responsible for the gain to the extent of 3,400 bbls. due principally to the big wells in the Bowers Pool. Carson County showed an increase of 295 bbls. Hutchinson County increased 630 bbls. Moore County increased 50 bbls. Wheeler County gained 150 bbls. and Potter County marked time. Production by counties follows:

County—	Bbls.
Carson County	7,905
Gray County	18,280
Hutchinson County	55,610
Moore County	150
Potter County	30
Wheeler County	1,250
Total this week	86,225
Total last week	81,695
Gain	4,530

WILDCAT OPERATIONS IN PANHANDLE

Week Ending December 3, 1927

ARMSTRONG COUNTY

Company, Well, Farm, Name, Section and Block— Remarks—

Meadows et al's No. 1 E. D. Harrel, C Sec. 100, Blk. A-6, A. & G. Sur. ..... 900 ft. wtr., 4,605 ft; drlg., 4,925 ft.
United Oil & Trust Co.'s No. 1 J. P. Reck, Sec. 162, Blk. 4, H. & G. N. Sur. ..... Drlg., 1,000 ft.

BAILEY COUNTY

Gibson Oil Co. et al's No. 1 Webb Miller, NE cor. Sec. 15, League 186, Swisher County school land..... Rig.
Humble O. & R. Co.'s No. 1 W. H. Fuqua, C E ½, Sec. 117, Blk. A, Melvin, Blum & Blum Sur. ..... Drlg., 1,920 ft.

BRISCOE COUNTY

C. S. Rice's No. 1 J. C. Anderson, SE cor. NW NW, Sec. 22, Blk. B-3, B. S. & F. Sur. ..... S.D., 1,620 ft.

CARSON COUNTY

Amatex Dev. Co.'s No. 1 E. S. Polling, Sec. 22, Blk. 2-Y.. T.A., 2,110 ft.
Marston Oil Co.'s No. 1 J. L. Noel ..... S.D., 3,064 ft.
Navajo Oil Co.'s No. 1 E. S. Polling, Sec. 22, Blk. 2-Y.. Set 6-in. 2,496 ft; S.D., 2,712 ft.
The Texas Company's No. 2 C. R. Garner ..... Drlg., 1,880 ft.
The Texas Company's No. 1 Chas. Kalka ..... Drlg., 840 ft.
Last Chance Oil Co.'s (formerly R. M. Waggoner's) No. 1 J. W. McConnell (was completed for 37,000,000 ft. of gas, 2,255-2,500 ft.) ..... Top pay, 3,250 ft; D.D. to 3,290 ft; C.O.; flowing 165 bbls. per day; to D.D.
Willis et al's No. 1 Burnett est., C SE SW NW, Sec. 111, Blk. 5 ..... Drlg., 2,562 ft.

CASTRO COUNTY

Colorado O. & R. Co.'s No. 1 M. Slemmons, SW cor. Sec. 78, Blk. M-17, B. S. & F. Sur. ..... Rig blown down.
Mystery Oil Co.'s No. 1 J. I. Crum, SE cor. NE. Sec. 333, Blk. M-6, S. K. & K. Sur. ..... S.D., 510 ft. for casing.

CHILDRESS COUNTY

Continental Oil Co.'s No. 1 B. P. Smith, C NE, Sec. 14, Blk. 9 ..... Wtr., 2,450 and 2,800 ft; 100 ft. sulphur wtr., 3,350-55 ft; drlg., 3,485 ft.
Hoover & Calloway's No. 1 O. L. Tucker, Sec. 736, Haggard Sur. ..... Spudded and S.D.
C. L. Sloane et al's No. 1 B. P. Smith, Sur. 49, F. P. Knott lands ..... Set 6-in. pipe, 2,902 ft; T.D. 3,050 ft; drlg., 3,600 ft.

COTTLE COUNTY

Exploration Co.'s No. 1 Richards..... Spudded and S.D.

DALLAM COUNTY

Wood Bros. et al's No. 1 Capitol Synd., Sec. 19, Blk. 17.. Hole full wtr., 4,007-4,127 ft; T.D. 4,188 ft; S.D. until Spring.
Marland Oil Co.'s No. 1 A. M. James, C SW W ½, Sec. 21, S. H. McElreath Sur. ..... S.D., 2,445 ft. for wtr.
Marland Oil Co. et al's No. 1 Capitol Synd., Sec. 36, Blk. 18, Capitol Synd. land..... U.R. 6-in., 3,254 ft; T.D., 3,280 ft.

DONLEY COUNTY

A. T. Drlg. Co.'s No. 1 F. E. Harrington, Sec. 39, Blk. 3-C ..... 1,200 ft. wtr., 3,115-22 ft; show gas, 3,140-60 ft; dry grnt. wash, 3,260-93 ft; S.D., 3,498 ft.

FLOYD COUNTY

Explto. Co.'s No. 1 S. H. Boone, C. C. H. Johnson Sur. .. Spudded and S.D.
Explto. Co.'s No. 1 Land & Cattle Co. ..... S.D., 780 ft. for orders.
Hoffer Oil Corp.'s No. 1 Nelson ..... Spudded and S.D.

GRAY COUNTY

Archer Blake's No. 1 Turneaux, SW cor, Sec. 111, Blk. B-2 ..... Drlg., water well.
Bay Shore Oil Co.'s No. 1 C. W. Bradford, Sec. 143, Blk. 2-B ..... T.D., 2,666 ft; S.L.M. shot with 10 qts. to loosen bit and 8-in. collapsed; fishing.
Camel Oil Co.'s No. 1 B. E. McKinney..... Rig.
Cole O. & G. Co.'s (was Magdalene Oil Co.'s) No. 1 J. E. Williams, Sec. 17, Blk. 1 ..... S.D., 3,860 ft.
Danciger O. & R. Co.'s No. 4 W. Jackson ..... Cmtng. 8¼-in., 2,721 ft.
Danciger O. & R. Co.'s No. 5 W. Jackson ..... Rig.
Danciger O. & R. Co.'s No. 6 W. Jackson, Sec. 88, Blk. B-2, H. & G. N. Sur. ..... Location.
Danciger O. & R. Co.'s No. 7 W. Jackson, Sec. 88, Blk. B-2, H. & G. N. Sur. ..... Location.
Donley Gray Oil Co.'s No. 1 J. W. Gordon, Sec. 79, Blk 3. Wtr., 3,380 ft. and 3,430 ft; show oil; H.F.W., 3,650; drlg., 3,670 ft.
Delaney et al's No. 2 Jackson ..... Drlg., 2,140 ft.
Edwards et al's No. 1 E. J. Case, NE cor. Sec. 182, Blk. B-2, H. & G. N. Sur. ..... 70,000,000 ft. gas, 2,512-2,630 ft; fish., 3,025 ft. for bit; show oil.
Gardner et al's No. 1 G. H. Saunders..... Cellar.
Gibson Oil Corp.'s No. 2 J. B. Bowers..... Drlg., 2,250 ft.
Gurnsey Oil Co.'s No. 1 B. E. McKinney ..... Drlg., 2,135 ft.
Lefors Pet. Co.'s No. 1 Leach, Lefors Townsite..... 10,000,000 ft. gas, 2,440-50 ft; 70,000,000 ft. gas, 2,625 ft; T.D., 2,650 ft; trying to pull 8-in. and it parted; fishing.
H. C. McCauley et al's No. 1 J. Morse, Sec. 2, Blk. 46, H. & G. N. Sur. ..... Top lime, 1,770 ft; drlg., 2,010 ft.
Magnolia Pet. Co.'s No. 1 J. Bowers ..... Cmtng. 12½-in., 900 ft.
Magnolia Pet. Co.'s No. 1 J. J. Wall, NE cor., Sec. 162, Blk. 3, I. & G. N. Sur. ..... Bldg. rig.
Midwest Explto. Co.'s No. 1 J. Bowers..... Drlg., 2,025 ft.
Midwest Explto. Co.'s No. 1 L. Holmes, Sec. 86, Blk. 3, I. & G. N. Sur. ..... Location.
Neudigate et al's No. 1 A. Chapman, NE cor. E ½ SE, Sec. 52, Blk. 25 ..... 500,000 ft. gas, 2,760-65 ft; rainbow of oil, 2,820-25 ft; salt water; granite wash, 2,2827-28 ft; S.D., 2,835 ft.
Operators Oil Co.'s No. 1 Jackson..... T.D., 2,863 ft; 1,800 ft. oil in hole from G.W., 2,836-63 ft.
Phillips Pet. Co.'s No. 1 Davidson (Myson) ..... Building rig.
Phillips Pet. Co.'s No. 1 W. Jackson (was Clark et al's No. 2) ..... Drlg., 2,615 ft.
Phillips Pet. Co.'s No. 2 W. Jackson (was Clark et al's No. 3) ..... Drlg., 2,525 ft.
Phillips Pet. Co.'s No. 3 W. Jackson ..... Drlg., 1,003 ft.
Phillips Pet. Co.'s No. 1 Jackson-Riley (was Clark et al's No. 1 W. Jackson) ..... 7,000,000 ft. gas, 2,442-2,545 ft; made flow, 2,942 ft; run. pipe.
Phillips Pet. Co.'s No. 2 Jackson-Riley ..... Drlg., 895 ft.
Pampa Oil Co.'s No. 1 W. R. Campbell, Sec. 90, Blk. 3.. 700 ft. water, 3,430 ft; S.D
Purple Sage Oil Co.'s No. 2 E. B. Johnson..... Rig.
Remo Oil Co.'s No. 1 B. E. McKinney.. ..... Rig.
Rensoul Pet. Co.'s (was Salisbury & Reynolds') No. 1 M. Huselby, C SE NE NE, Sec. 55, Blk. 25, H. & G. N. Sur. ..... Flowing 30 bbls. daily; T.D., 2,950 ft; fish, 2 strings tools.

(Continued on Page 138-A)

Pecos Field Extended Two Directions

Simms Oil Co. Completes Another Big Gusher on Northern Edge Flowing 48,000 Bbls. Daily. Big Winkler Wells

By C. D. Lockwood
Staff Correspondent, North and West Texas

FORT WORTH, Tex., Dec. 5.—Extensions in two directions in the Pecos Field, completion of another big gusher in the "notorious" pool and completion of big wells in Winkler County were the chief attractions in the West Texas areas. Production took another climb and gained 16,500 bbls.

Pecos was extended one mile west by Kirby Petroleum Co. and Edson's No. 1 J. H. Tippett, Section 108, Block 194, when it was completed flowing 800 bbls. from pay at 1,293-1,465 feet. The well is in the northwestern part of the pool. Mid-Kansas Oil & Gas Co. and Transcontinental Oil Co.'s No. 3 I. G. Yates, E. Section 59, Block 1, made the half mile southeastern extension when it was completed as a 300-bbl. well at 1,055-66 feet.

In addition to the two extension wells Pecos was enlivened by another big gusher that ranks second to the Mid-Kansas Co. and Transcontinental Co.'s No. 2-C Yates gusher. Simms Oil Co.'s No. 3 Smith in Section 103 on the northern edge of the pool came in flowing at the rate of 48,000 bbls. daily. The well had the pay at 1,187 feet and is bottomed at 1,197 feet. It flowed 10,000 bbls. through three 4-inch lines in five hours and was then pinched in. Later when the well was opened for one hour to get a proration it did a little better than 1,500 bbls.

Water is showing on both sides of No. 2-C Yates. Wells completed on the west and east side are both showing water but no water showing has been found in the production of No. 2-C Yates. Another good completion, and made late in the week, was Gulf Production Co.'s No. 2 Yates on the Runnells County School Land. It made 10,262 bbls. in 24 hours from 1,258 to 1,349 feet.

When all of the wells were gauged December 1 the gauge indicated the field had a potential production of 604,968 bbls. daily. Engineers studying conditions in the field, however, are of the opinion the famous shallow pool would do well to produce half that much oil from its present number of wells if all were opened wide. The field is actually producing 43,660 bbls. daily from 66 wells.

It is probable that a new proration plan will be evolved when representatives of Pecos producers meet in Fort Worth December 12. At the last meeting it was unanimously agreed the proration of the field should be extended beyond January 1.

Winkler County

Winkler County, with a flock of wells drilling and 13 locations reported at the close of the week, is steadily sending the West Texas production upward. Six wells were completed in that field last week with a combined production of 25,915 bbls., and one well was pinched in. The six wells had an average initial production of 4,320 bbls. Largest of the group was Independent Oil & Gas Co.'s No. 1 Grisham & Hunter which made 7,508 bbls. initial. Two 6,000-bbl. wells were completed in that field last week.

Magnolia Petroleum Co.'s No. 1 Ida Hendrick, Section 29, Block B-5, the east offset to the Roxana Corp.'s 980-bbl.-per-hour well, is drilling in and is making 30 bbls. per hour from 2,830-40 feet. The daily average production of Winkler last week was 38,482 bbls. and was an 8,000 bbls. increase over the previous week's production. A cramped outlet for the field's production is holding it down. Tank car shipments from the two loading racks in that field averaged 18,546 bbls. daily during the past seven-day period checked.

The Atlantic Co. is stringing pipe for its 10-inch line from Winkler to Midland and the Shell Pipe Line Corp. is stringing pipe for its 6-inch line from McCamey to Winkler. The latter line will run through Crane-Upton and will connect with the company's 10-inch line at McCamey running from Pecos to Healdton. At Healdton the line will intersect the Ozark Pipe Line Co.'s line to East St. Louis. In addition to the Winkler crude that is going south to Gulf Coast ports and refineries a considerable amount is going to refineries in the North.

Magnolia Pipe Line Co. is testing its 8-inch line from Midland to DeLeon and using water to make the test. The same company is reported to be preparing to build five 55,000-bbl. tanks in the SW of Section 12, Block 30, 10 miles northeast of the Chalk Pool in Howard County. Two 55,000-bbl. capacity tanks are being built there at present and three 1,600-bbl. tanks are being built for storage for the Magnolia Petroleum Co.'s No. 1 Dora Roberts in Section 136, Block 29, Howard County and which opened lime production there. The well came in the latter part of October making 1,400 bbls. in seven hours from 2,990 feet. It was opened recently and made 2,234 bbls. the first day and 2,834 bbls. the second day. Two miles northeast of the Magnolia well the Magnolia Oil Co.'s test failed as a producer in lime.

Back to the Winkler Field, one of the most important and closely watched tests is the Amerada Petroleum Corp.'s No. 1 J. B. Walton, Section 48, Block 26, which is being drilled ahead. The test is 2½ miles northeast of production. It cored brown lime carrying oil at 2,334 feet. The test was standardized at that depth and Monday various unconfirmed reports reached Fort Worth concerning the developments. All reports were to the effect the well was making gas while some credited the well with blowing the tools out of the hole.

In Crane County the Simms Oil Co. and Atlantic Oil Producing Co. completed another good well on their University lease when No. 10 University D came in making 2,800 bbls. initial. That completion was the only one of merit reported from Crane County.

One of the largest deals of the year was made in the Wichita Falls district when Bridwell & Heydrick sold all of their holdings in Wilbarger, Archer, Young and Wichita Counties to the Reno Oil Co. of Sistersville, W. Va., for a reported consideration of $1,000,000 cash. The deal included 1,000 acres of leases with 840 bbls. of daily production from 155 wells.

Production in North and West Texas exclusive of the Panhandle rose to 388,529 bbls. last week, an increase of 15,079 bbls. The Ranger district showed a decline as did the Wichita Falls district. However, the gains in West Texas were sufficient to keep production on a rapid climb.

Montague County

Continental Oil Co. and The Texas Company's No. 1 Salmon-B, dry and abandoned at 1,626 feet.

Wichita County

Ascot company's No. 19 J. E. Roller, initial production 15 bbls. from 1,188-1,200 feet. Ascot company's No. 40 J. E. Roller, initial production 25 bbls. from 1,170-88 feet. Ascot company's No. 41 J. E. Roller, junked and abandoned at 1,583 feet. Ascot company's No. 42 J. E. Roller, initial production 20 bbls. from 1,178-87 feet. Ascot company's No. 43 J. E. Roller, dry and abandoned at 1,794 feet. Ascot company's No. 44 J. E. Roller, dry and abandoned at 1,634 feet. C. E. Burk and others' No. 1 B. F. Dutton, dry and abandoned at 1,265 feet. Lenoir Oil Co.'s No. 2 R. Netschke and others, initial production 5 bbls. from 744-46 feet. Lenoir Oil Co.'s No. 3 R. Netschke and others, dry and abandoned at 748 feet. Magnolia Petroleum Co.'s No. 136 H. Railly, initial production 25 bbls. from 1,337-42 feet. W. J. Moran's No. 13 F. P. Warren, initial production 25 bbls. from 1,414-25 feet. W. M. Moore's No. 3 R. L. Crudeys, initial production 10 bbls. from 692-95 feet. C. W. Cooper and others, formerly Bailey, Damuth Drilling Co.'s No. 7 Waggoner Brothers, initial production 1 bbl. from 791-96 feet. Dale Oil Corp.'s No. 5 Kemp-Kemper-B, junked and abandoned at 1,460 feet. Electra and Gulf company's No. 8 J. N. Watkins, dry and abandoned at 1,792 feet. Henry Hobbs' No. 1 W. L. Hodges, initial production 18 bbls. from 1,523-25 feet. Joffee and others' No. 5 T. F. Mitchell, initial production 10 bbls. from 420-38 feet. Joffee and others' No. 6 T. F. Mitchell, initial production 10 bbls. from 416-40 feet. Joffee and others' No. 7 T. F. Mitchell, initial production 10 bbls. from 421-43 feet. Joffee and others' No. 8 T. F. Mitchell, initial production 40 bbls. from 1,866-67½ feet. Joffee and others' No. 9 T. F. Mitchell, initial production 5 bbls. from 420-42 feet. Joffee and others' No. 10 T. F. Mitchell, initial production 5 bbls. from 425-46 feet. Joffee and others' No. 11 T. F. Mitchell, dry and abandoned at 1,990 feet. O'Donohoe & Gates' No. 3 Love (deep) 37 bbls. from 1,814-18 feet. John O'Neil's No. 2 Allingham-B, dry and abandoned at 840 feet. The Texas Company's No. 339 W. T. Waggoner, dry and abandoned at 2,250 feet.

Wilbarger County

Humble Oil & Refining Co.'s No. 1 Castleberry-A, dry and abandoned at 2,583 feet. Milham corporation's No. 1 Waggoner-C, initial production 30 bbls. from 1,932-41 feet. Murchison Oil Co.'s No. 1 Waggoner-D, junked and abandoned at 618 feet. Phillips Petroleum Co.'s No. 8 Waggoner-T, initial production 90 bbls. from 1,862-80 feet. Phillips Petroleum Co.'s No. 9 Waggoner-T, initial production 30 bbls. from 2,326-30 feet and 2,385-95 feet.

Young County

Continental Oil Co.'s No. 1 Eichel-

WILDCAT OPERATIONS IN WEST TEXAS

Week ending December 3, 1927

Company, farm and location—	Remarks—
ANDREWS COUNTY	
George B. Calvin's (was Calvin & Belt's) No. 1 Ratliff & Bedford, C NE Sec. 16, Blk. A-54	Hole full fresh water 1,055 ft.; top salt 1,610 ft.; total depth 2,575 ft.; shut down.
J. S. Cosden's No. 1 Ratliff & Bedford, C SE Sec. 8, Blk. 73, Public School Land	Top salt 1,585 ft.; shut down 4,007 ft., contract depth; will deepen.
Sartain Oil Co. et al's (was Deep Rock Oil Co.'s) No. 1 W. J. Harris, C SE Sec. 12, Blk. A-46, Public School Land, elev. 3,167 ft.	Hole full fresh water 1,050 ft.; shut down 1,260 ft.
B. B. McKennon's (was Neff et al's) No. 1 J. S. Means, C SE Sec. 12, Blk. A-35, Public School Land	Cleaning out 1,385 ft.
A. G. Carter & Zweifel's No. 1 Cowden, C SE Sec. 18, Blk. A-52, Public School Land Sur., elev. 3,156 ft.	Top salt 1,375 ft., encountered pocket of air 3,635 ft., drilling 4,774 ft.
BORDEN COUNTY	
Marland Oil Co.'s No. 1 G. E. McDavid, C SW Sec. 156, Blk. 25, H. & T. C. Sur.	Drlg. 512 ft.
BREWSTER COUNTY	
Cady & Keller's No. 1 Decies	Rig on ground.
J. M. Hickey's No. 1 Jackson & Harmon, NE cor. Sec. 182, Blk. 9, G. H. & S. A. Sur.	Drlg. 505 ft.
Mid-Kansas O. & G. Co.'s No. 1 Turney, Sec. 77, Blk. 213, T. & St. L. Sur.	Drlg. lime 2,070 ft.
Reese & White's No. 1 Kimbale, C NE Sec. 204, Blk. 9, G. H. & S. A. Sur.	Drlg. black sandy lime 1,050 ft.
Van McPhail's No. 1 McIntyre, SE cor. Sec. 59, Blk. 352, 7 mi. S of Alpine	Shut down 1,025 ft.
Wilcox & Anderson's No. 1 Gage, Sec. 8, Blk. 300, T. C. R. R. Sur.	Shut down 1,582 ft.
COKE COUNTY	
W. H. Brown et al's No. 1 W. L. Foster, SE cor. Sec. 142, Blk. 2, H. & T. C. Sur., elev. 2,222 ft.	Shut down 2,250 ft.
Danciger O. & R. Co.'s No. 1 Mrs. Byrnes, Clinton Sur.	Drlg. anhydrite 3,100 ft.
Lipan Oil Co.'s No. 1 S. M. Conner, Sec. 71, Blk. 2, H. & T. C. Sur.	Show oil 1,224-34 ft.; shut down lime 3,312 ft.
Lipan Oil Co.'s No. 1 E. C. Rawlings, Sec. 390, Blk. 1-A, H. & T. C. Sur., elev. 2,750 ft.	Total depth 2,736 ft.; clean. out.
CONCHO COUNTY	
Parks & Lawson's No. 1 Schultz	Show oil 925 ft.; shot with 40 and 30 qts.; no results; drilling shale 1,075 ft.
The Exploration Co.'s No. 1 Hartgrove, Blk. 240, J. Schouch Sur., elev. 1,718 ft.	Drlg. lime 738 ft.
CRANE COUNTY	
Crane Dev. Co.'s No. 1 J. R. Mosley, S cor. Sec. 18, Blk. 6, H. & T. C. Sur.	Shut down 450 ft.
Marland Oil Co.'s No. 1 Union Land, E cor. of W Sec. 28, Blk. 35, H. & T. C. Sur., elev. 2,298 ft.	Top salt 825 ft.; 1,300 ft. sulphur water at 2,100 ft.; flowing sulphur water per hour 2,265 ft.; shut down.
Duffey & Gault & Brown's No. 1 Cowden, CNL S half NE Sec. 22, Blk. X, C. C. S. D. Sur.	Hole full fresh water 620-25 ft.; top salt 895 ft.; top lime 2,729 ft.; show oil 3,030 ft.; shut down 3,205 ft. for orders.
Gulf Prod. Co.'s No. 3 W. N. Waddell, SE cor. NE Sec. 3, Blk. B-25, Public School Land	Running 12½-in. pipe to 600 ft.
J. K. Hughes Dev. Co.'s No. 1 State Bank Commission, CSL Sec. 18, Blk. 4, H. & T. C. Sur.	Location.
Texas Development Co.'s No. 1 J. Cowden	Top lime 2,635 ft.; drlg. 4,003 ft.
CROCKETT COUNTY	
George Anderson and Marland Oil Co.'s No. 1 University	Hole full sulphur water 1,800 ft., ⅛ baller oil 2,240 ft.; ⅛ baller sulphur water per hour 2,475 ft.; shut down 2,631 ft.
V. T. Bolin & Co.'s No. 1 P. C. Coates, NW cor. SW Sec. 4, Blk. 2, I. & G. N. Sur.	Shut down 2,110 ft.
Corbett & Gill's No. 1 University	Top salt 855 ft.; smell gas 1,806 ft.; hole full sulphur water 1,985-90 ft.; shut down 2,050 ft. for pipe.
J. S. Cosden, Inc., No. 1 Paul Perner, SW cor. Sec. 36, Blk. 2, I. & G. N. Sur.	Shut down 595 ft. for 15-in. pipe.

(Continued on Page 138-B)

berger, dry and abandoned at 1,001 feet. Foster's No. 1 Driver, dry and abandoned at 1,960 feet. Pitzer & West's No. 2 Hinson, initial production flow 550 bbls. from 2,200-05 feet. Pitzer & West's No. 4 Morrison-A, initial production 300 bbls. from 2,224-29 feet.

WEST TEXAS NEW LOCATIONS

Pecos County

Humble Oil Co.'s No. 3 M. A. Smith-B, 200 feet each way from NW cor. of Section 101, Block 194, K. C. & S. F. R. R. Survey. McMan Oil Co.'s No. 1 J. H. Tippett, 200 feet each way from northeast corner of the south 80 acres of Section 108, Block 194, G. C. & S. F. R. R. Survey. Douglas Oil Co.'s No. 2 John T. Sellman, 990 feet from south line and 2,310 feet from west line of Section 14, Block Z, T. C. Railway Survey. Roxana Petroleum Corp.'s No. 5 J. H. Tippett, 1,662 feet north of south line and 1,673 feet west of east line of Section 102, Block 194, G. C. & S. F. R. R. Survey. Roxana Petroleum Corp.'s No. 6 J. H. Tippett, 1,662 feet north of south line and 2,344 feet west of east line of Section 102, Block 194, G. C. & S. F. R. R. Survey. Roxana Petroleum Corp.'s No. 5 M. A. Smith, 2,071 feet from west line and 1,100 feet from south line of Section 27, Block 194, G. C. & S. F. R. R. Survey.

Upton County

Texas-Pacific Coal & Oil Co.'s No. 11 J. F. Love-A Lease, 2,970 feet from south line and 990 feet from west line of Section 5, G. C. & S. F. R. R. Survey, Abstract A-213.

Howard County

Sun Oil Co.'s No. 1 W. R. Settles, 330 feet from south line and 330 feet from east line of Section 135, Block 29, W. & N. W. R. R. Survey. Weekly Oil Corp. and other's No. 1 Dora Roberts, 990 feet from east line and 2,490 feet from south line of Section 156, Block 29, W. & N. W. R. R. Survey Lockhart & Co.'s No. 1 Dora Roberts, 2,310 feet from east line and 1,650 feet from north line of Section 157, Block 29, W. & N. W. R. R. Survey. Coyle-Concord Oil Co.'s No. 3 Dora Roberts, 660 feet from east line and 1,470 feet from north line of Section 156, Block 29, W. & N. W. R. R. Survey.

Terrell County

Humble Oil Co.'s No. 1 University, 490 feet from north line and 2,790 feet from east line of Section 15, Block 34, University Land.

NORTH CENTRAL TEXAS AND WEST TEXAS

Estimated Daily Production, Week Ending December 3, 1937

Ranger District—	Prod.
Brown County	19,050
Callahan County	4,012
Coleman County	1,145
Comanche County	1,465
Palo Pinto County	456
Ranger County	9,244
Shackelford County	4,996
Stephens County	8,823
Total Ranger district	49,191
Decrease	477
Wichita Falls Dis.rict—	
Archer County	22,200
Baylor County	87
Clay County	539
Cooke County	5,101
Jack County	1,106
Montague County	9,872
Throckmorton County	1,246
Wichita County	27,684
Wilbarger County	10,465
Young County	12,037
Total Wichita Falls district	90,337
Decrease	956
To.al North Central Texas	139,528
Decrease	1,433
West Texas District—	
Big Lake Field	23,592
Crane County	110,778
Crockett County	2,827
Ector County	14
Glasscock County	S.D.
Howard County	6,218
Jones County	1,384
Loving County	65
Mitchell County	3,457
Pecos County	43,660
Runnels County	95
Scurry Coun.y	45
Upton County	18,024
Winkler County	38,842
Total West Texas district	249,001
Increase	16,512
Total North and West Texas	388,529
Increase	15,079

NORTH CENTRAL TEXAS COMPLETIONS

Brown County

Barton's No. 1 Cason Brothers was dry and abandoned at 1,710 feet. Cranfill & Reynold & Mitchan's No. 1 Debusk was dry and abandoned at 1,400 feet. Cranfill & Reynolds' No. 18 Smith was shot with three quarts at 1,336-51 feet without results. The same formation was shot with 5 quarts and the well made 50 bbls. initial. Ditto Oil Interests' No. 1 Boler was abandoned after a 360-quart shot at 2,168 to 2,258 feet. Humble Oil & Refining Co.'s No. 9 Gilbreath made 48 bbls. iintial from 1,292 to 1,311 feet. Ratblatt's No. 2 Jones was dry and abandoned at 1,402 feet. Schaffner's No. 6 Henson made 12 bbls. initial after a 20-quart shot at 1,254-66 feet. Advance Oil Co.'s No. 3 Hart was completed at a 750,000-foot gas well after two 60-quart shots at 1,565 to 1,610 feet and a 40 and 30-quart shot at 1,470 to 1,515 feet. United Royalties Co.'s No. 1 Barnes was completed as a 1,000,000-foot gas well at 1,154-71 feet; total depth 1,283 feet.

Shackelford County

Bridwell & Heydrick's No. 2 McKelvey was a hole fu'l of water at 1,260 to 1,314 feet and was abandoned. Roeser & Pendleton's No. 4-B-60 Cook made 50 bbls. initially from 1,217-43 feet.

Eastland County

Hooser's No. 6 Fox made 50 bbls. initial from 1,614-21 feet. Mook Texas Oil Co.'s No. 1 B. Casey is making 25,000,000 feet of gas and 75 bbls. of oil from 3,013-22 feet. Teatsorth and others' No. 1 Morton made 1,000,000 feet of gas at 1,340-41 feet. Moorman and associates' No. 1 Thorp and others was dry and abandoned at 3,830 feet.

Palo Pinto County

Upham Gas Co.'s No. 1 Wharton gauged 3,500,000 feet of gas from 4,038-40 feet after being plugged back from 4,238 feet.

WEST TEXAS COMPLETIONS

Howard County

F. H. E. Oil Co.'s No. 2 Roberts Lease "A", pumping 52 bbls. from 1,851-63, total depth 1,873 feet. Marland Oil Co.'s No. 1 Fisher, dry and abandoned at 3,850 feet.

Winkler County

Cranfill & Reynolds' No. 1 Ida Hendricks-A, topped the pay at 2,875 feet, total depth 2,887 feet, initial production 6,006 bbls. Cranfill & Reynolds' No. 2 Ida Hendricks-A, topped the pay at 2,850 feet, total depth 2,983 feet, initial production 1,500 bbls. Humble Oil & Refining Co.'s No. 4 Grisham & Hunter topped the pay at 2,866 feet, total depth 2,890 bbls., initial production 2,232 bbls. Roxana Oil Co.'s No. 1 Ida Hendricks-C topped the pay at 2,692 feet, total depth 2,885 feet, initial production 6,708 bbls., pinched. Southern Crude Oil Purchasing Co.'s No. 3 Ida Hendricks T-67-C topped pay at 2,955 feet, total depth 3,030 feet, shot with 300 quarts at 2,950-3,025, initial production 1,961 bbls. Independent Oil Co.'s No. 1 Grisham-Hunter, top of first pay at 2,824 feet, top second pay at 2,878, total depth 2,879 feet, initial production 7,508 bbls.

Upton County

Roxana Oil Co.'s No. 27 Bowen, [illegible] abandoned. Tulsa Drilling Co.'s No. 1 W. A. Chaney, total depth 2,435 feet, hole full sulphur water at 2,429-35, abandoned, show of oil in lime at 2,090-2,[illegible] feet.

Crane County

Pecos Oil Co.'s No. 9 University, total depth 2,961 feet, topped the pay at 2,[illegible] feet, initial production 85 bbls. on pump. Simms Oil Co. and Atlantic Oil Producing Co.'s No. 10 University topped the pay at 2,825 feet, total depth 2,940 feet, initial production 2,800 bbls.

Pecos County

Humble Oil & Refining Co.'s No. 2 M. A. Smith-B topped the pay at 1,313 feet, total depth 1,451 feet, initial production 160 bbls. per hour wide open. Kirby Petroleum Co. and Edson's No. 1 J. H. Tippett topped the pay at 1,293 feet, total depth 1,465 feet, initial production 800 bbls. per hour open. Marland Oil Co.'s No. 1 I. G. Yates topped the pay at 1,241 feet, total depth 1,327 feet, formerly completed at 1,315 feet, and made 2,730 bbls. first 10 hours. At 1,327 feet it made 1,130 bbls. per hour. Mid-Kansas Oil & Gas Co. and Transcontinental Oil Co.'s No. 3 Smith-Taylor topped the pay at 1,305 feet, total depth 1,423 bbls., 322 bbls. per hour. Mid-Kansas Oil Co.'s No. 5 Yates-C topped the pay at 1,032 feet, total depth 1,130 feet, initial production 330 bbls. per hour, 40 per cent water. Mid-Kansas Oil Co.'s I. G. Yates-D topped the pay at 1,063 feet, total depth 1,330 feet, initial production 802 bbls. in two hours through two 4-inch lines. Mid-Kansas Oil Co.'s I. G. Yates-E topped the pay at 1,055 feet, total depth 1,060 feet, initial production 125 bbls. in 12 hours through one 4-inch line. Red Bank Oil Co.'s No. 2 Smith topped the pay at 1,515 feet, total depth 1,667 feet, 30 bbls. per hour open. Simms Oil Co.'s No. 3 M. A. Smith topped the pay at 1,187 feet, total depth 1,197 feet, initial production 10,000 bbls. in five hours through three 4-inch lines. California Co.'s No. 7 I. G. Yates topped the pay at 1,182 feet, total depth 1,202 feet, initial production 1,804 bbls. per hour open. Kirby Petroleum Co.'s No. 1 W. W. Turney was temporarily abandoned at 1,189 feet.

WICHITA FALLS DISTRICT

Archer County

Atlantic Oil Producing Co.'s No. 1 Marigold, dry and abandoned at 1,803 feet. G. Brown's No. 1 Mrs. Wallace, dry and abandoned at 1,807 feet. Consolidated and Continental Oil Co. of Texas' No. 6 Netherton, dry and abandoned at 1,568 feet. Seaberry & Brand's No. 1 Perkins and others, pumping 6 bbls. at 647-56 feet. Shappell Oil Co.'s No. 11 Wilson-B, initial production 15 bbls. at 890-96 feet. Shappell Oil Co.'s No. 18 Wilson-B, initial production 4 bbls. at 890-902 feet. Burns and The Texas Company's No. 2 Burns, initial production 8 bbls. oil and 9 bbls. water at 1,504-13 feet. Carey & Rhader's No. 2 Farmer, initial production 28 bbls. at 1,509-11½ feet. Consolidated Oil Co.'s No. 1 Stevens Roach Co., dry and abandoned at 1,126 feet. Foster & Erwin's No. 1 Ball dry and abandoned at 600 feet. Murchison Oil Co.'s No. 2 Cowan, dry and abandon at 1,117 feet. Panhandle & Burton's No. 2 Farmer-B, dry and abandoned at 1,541 feet.

Cooke County

Campbell-Heydrick and Oil Operators Trust Co.'s No. 1 Fleetman, initial production 37 bbls. from 1,365-88 feet. Martin and others' No. 2 Bindle, initial production 27 bbls. from 1,375 95 feet.

Denton County

Hudson Brothers' No. 1 Trietsch, temporarily abandoned at 722 feet.

Jack County

Fletcher Royalty & Development Co.'s No. 1 Johnson, temporarily abandoned at 2,501 feet. Connell & Wixon's No. 3 Ellis and others, initial production 10 bbls. from 493-512 feet. Dale Oil Corp.'s No. 3 Hanna, dry and abandoned at 555 feet. Thedford Brothers' No. 5 Richards & Hanier, initial production 8 bbls. from 480-93 feet.

SCENERY HILL IS MOST ACTIVE SPOT NOW IN THE EASTERN FIELDS

By D. S. Wakenight
Staff Correspondent, Eastern Fields

PITTSBURGH, Pa., Dec. 5.—Since last reviewed the eastern fields have been very dull. Few wells were completed and none above the average pumper. The deep sand in southeast Ohio made a very poor showing, both the deep and shallow territory completing very few wells and all small producers, gas wells or light pumpers.

At the present time few, if any, operators are holding in reserve any undeveloped territory that is known to be productive. Producers are giving much attention to getting the old wells in good shape for the winter, rather than start new work. In the local fields there is very little doing outside of the town lot development at Scenery Hill, West Bethlehem Township, Washington County, Pa. There have been seven wel's completed,, one a duster and six drilling. All but the dry hole are gassers. Neither town lot oil wells nor gassers have a reputation for their staying qualities. This development will not prove an exception.

West Virginia

One-half mile above the mouth of Road Run of Beech Fork Lee district, Calhoun County, West Virginia, McCall Drilling Co. drilled its test on the Alva Laughlin farm through the Gordon sand and found it dry. The Big Injun sand showed a fair gas pressure when drilled through but they did not stop. Subsequently they filled back to the Big Injun sand, gave it a shot and now have a gasser good for 1,000,000 feet.

In Grant district, Ritchie County, the Astron Oil Co. has completed No. 7 on the Herman Strusburg Realty Co.'s property good for 3 bbls. a day in the Big Injun sand. In Murphy district, the Cairo Oil Co.'s test on the Vincent Morris farm is a gasser in the salt sand. The West Fork Oil Co.'s test on the Helena Andrews farm is good for 5 bbls a day in the same formation. In the same district, Joshua Haught and others drilled deeper to the Big Injun sand a test on the Joshua Haught farm. It is a duster. In the same district, the Hope Natural Gas Co. has a light show of oil in the salt sand at a second test on the J. L. Hill farm. On McFarlan Creek,, Murphy district, J. F. Deen and Co. have completed in the salt sand No. 3 on the Joseph Linglar farm and have a 5-bbl. pumper. On Big Coedcreek, Southwest district, Doddridge County, Ira D. Cox has the rig completed for a test on the S. L. Spurgeon farm.

In Mannington district, Marion County, the Buffalo Oil Co. has a light show of oil in the Fifth sand, on the N. C. Grim farm. In Church district, Wetzel County, S. W. Ellis has a 5-bbl. pumper in the Big Injun sand at No. 5 on the Nancy Maple farm.

Cabell County

In Grant district, Cabell County, the Aetna Oil & Gas Co. has completed a test on the Robert Hatfield farm. It is a gasser in the Big Injun sand. In McElroy district, Tyler County, Sutton Brothers, have a gasser in the Big Injun sand at a second test on the J. V. Blair farm.

In Battelle district, Monongalia County, the Carnegie Natural Gas Co. has a gasser in the Fifth sand at a test on the O. L. Talkington farm. This was formerly a gasser drilled down to the lower sand. In Duval district, Lincoln County, J. V. Reishman has completed a second test on the D. G. Beheler farm.

In Grant district, Pleasants County, Swingle Brothers completed in the Big Injun sand a test on the Fulton Holdren farm. It is a 5-bbl. pumper. In DeKalb district, Gilmer County, C. B. Lewis and others have completed a test on the F. Davis farm. It is a gasser in the Maxon sand. In Center district, Wetzel County, the Carnegie Natural Gas Co.'s second test on the F. M. Wade farm is dry in all sands. It has been abandoned.

Calhoun County

In Sheridan district, Calhoun County, Godfrey L. Cabot has a gasser in the Big Injun sand at a test on the L. S. Stump heirs' farm. In Lee district, the United Carbon Co.'s second test on the D. C. Craddock farm is a gasser in the same formation.

In Center district, Calhoun County, the Gerwig Oil & Gas Co. has a Big Injun sand gasser at No. 5 on the M. Hardman farm. In Lee district, McCall & Co. have drilled deeper their test on the Millie Laughlin farm and it is a gasser in the Berea grit.

On Lambs run, Murphy district Ritchie County, the West Fork Oil & Gas Co. has drilled a second test on the Lena Anderson farm into the Maxon sand good for 50 bbls. a day. On Polecat run, Elk district, Kanawha County, the South Penn Oil Co. has cleaned out in the

(Continued on Page 138-D)

The New Improved Dunn Safety Casing Tongs

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Shooting Over, Seminole Output Drops

Failure of Phillips Well at Burbank Dampens Enthusiasm Over Coming Osage Lease Sale. Wildcats Getting Deep

By J. L. Dwyer
Staff Correspondent, Oklahoma Fields

Completion of the shooting campaign at Seminole was accompanied by a substantial decline in output, and on Sunday and Monday of this week the pools produced 411,598 and 406,239 bbls. respectively. The drop was evenly distributed over all pools, with a decline in each of the active regions.

Enthusiasm over the coming Osage lease sale scheduled for December 12, suffered a decided chill when the north offset to the Oliphant discovery well was completed dry and missed the Burbank sand altogether. This well was Phillips Petroleum Co.'s No. 2, SE cor. SE, Section 17-27-6, and it had reached a depth of 4,660 feet. There was a broken formation of shale and sand about 6 feet thick found at 2,880 feet, but it was mostly shale.

The Osage well tends to strengthen the theory that the discovery well in the NE cor. NE, Section 20-27-6, which was drilled by A. G. Oliphant and others, is located on a narrow strip which will compare in width with the other trends on the east side of the Burbank Field, and will not be the starter of a new pool of consequence. The property has since been purchased by the Prairie Oil & Gas Co.

The wildcat wells around the Seminole area have had little change in the past week. The Carter Oil Co.'s well, in Section 18-6-8, which was promising to make a well, is still fishing at 3,936 feet.

The Barnsdall Oil Co.'s well in Section 14-8-5, is now 72 feet into the Viola limestone at a total depth of 4,245 feet, and should reach the Wilcox this week.

Snowden & McSweeney's wildcat, in Section 13-7-6, is drilling in the Simpson sand at 4,311 feet, and should tap the Wilcox within the next 10 feet or so.

SEMINOLE PRODUCTION FOR DECEMBER 3, 1927

Little River

Company and farm—	Wells	Prod.
Amerada:		
Fore	1	270
Nitey	4	2,895
Blackwell:		
Nitey	8	5,053
Carter:		
Fish	1	695
Continental:		
Cosar	2	1,225
Gypsy:		
Campbell	2	620
Nungee	1	32
Pottey	2	1,497
Wadsworth	1	30
Independent:		
Harris	1	104
Indian Territory:		
Campbell	1	249
Dungan	3	3,846
House, M. A.	1	802
House, W. E. "A"	1	64
House, W. F. "B"	3	2,690
Jackson	3	3,259
McCulla	3	1,088
Nitey	6	2,499
Phoebe, "A"	2	820
Phoebe, "B"	3	1,417
Reed	1	169
Sokelteche	4	1,580
Mid-Continent:		
Wadsworth	7	1,865
Smith	1	40
Philmack:		
Davis	1	1,327
Prairie:		
House	4	2,860
Roxana:		
Smith	1	26
Superior:		
Wadsworth	1	31
The Texas Company:		
Coker	3	785
Tidal:		
House	1	1,422
Johnson	1	70
Total	76	39,330

Bowlegs

Amerada:		
Rasco	8	3,816
Atlantic:		
Baker	4	1,015
Fleet	4	922
Grayson	2	1,864
Jones, A.	3	144
Jones, C.	2	484
Barnsdall:		
McNac	1	35
Murrow	4	1,302
Carter:		
Bowlegs	3	1,315
Burden	3	640
Harjoche	6	990
Hilly	2	1,005
Jones	3	3,745
McGeisey	1	.....
Melissa	1	640
Walker	3	2,060
Wise	12	8,300
Empire:		
Lacy	6	735
Wise	2	1,347
Gypsy:		
Bowlegs	1	325
Bradley	1	60
Brown	1	50
Cumsey	4	1,942
Dosar	1	100
Grayson	4	2,597
Jones	1	.....
Walker	8	482
Wise	3	2,070
Independent-Marland:		
Coker	1	168
Indian Territory:		
Barnett	2	657
Billington	5	1,002
Bowlegs	11	1,466
Burden	1	38
Davis	4	2,485
Fay	6	5,714
Goforth	11	1,926
Hull	1	108
Livingston	11	5,412
Lizzie	2	1,146
Walker	8	1,555
Wilmont	4	1,533
Youngblood	2	48
Magnolia:		
Davis, B. F.	1	870
Davis, M.	1	670
Hammond	2	26
Rhoades	1	368
McColloch:		
Bowlegs	3	190
Mid-Continent:		
Baker	4	2,485
Bowlegs	1	185
Hutke	1	5
Smith	4	1,040
Minnehoma:		
Bowlegs	3	190
Prairie:		
Gahagan	4	1,480
Harber	7	3,965
Jones	2	2,270
Templeton	4	5,000
Whitney	4	170
Pure:		
Reed	15	5,993
Strothers, "D"	3	997
Strothers, "E"	1	5
Strothers, "F"	2	1,197
Roxana and Houston:		
Taylor	6	1,648
Shaffer:		
Lacy	3	710
Sinclair:		
Bowlegs	1	95
Cumsey	2	4,877
Ellen	6	3,045
Harjo	3	1,445
Jones	6	6,140
Taylor	4	4,860
Walker	4	1,205
The Texas Company:		
Reed	9	5,810
Tidal:		
Grayson	3	1,505
Harjoche	6	2,820
Twin State:		
Jones	2	80
Total Bowlegs	284	122,886

Earlsboro

Amerada:		
Anderson	5	1,325
Cowden	8	2,420
Rodgers	2	3,295
Barnsdall:		
Brown	4	3,977
Bruner, F.	2	917
Bruner, N.	4	2,861
Cudjo, C.	1	13
Davis, D.	3	3,933
Davis, J.	3	2,617
Davis, M.	3	1,799
Gibson	7	4,252
Hearn	1	8
Ingram	9	9,525
Jack	4	373
Peter	4	324
Sango	2	982
Sebolka	1	1,432
Sullivan, H.	2	268
Sullivan, Harjo	3	79
Wasutke	4	988
Carter:		
Davis	1	1,255
Payne	3	965
Sango	3	8,040
Continental:		
Kays	2	1,120
Spencer	4	1,895
Crosbie:		
Bryant	2	470
Empire:		
Barker	1	3,329
Edmundson	3	2,665
Gypsy:		
Bruner	4	5,412
Carter	10	6,862
Earl	1	.....
Hunick	1	477
McFarland	1	.....
Noble	4	7,465
Peter	6	925
Sango	4	8,282
State	4	1,830
Independent:		
Bruner	4	1,000
Sullivan	4	35
Knapp	5	3,957
Gaines	2	4,895
O'Dell	4	205
Inter-Ocean:		
Payne	1	20
Magnolia:		
Bryant	6	2,525
Cowden	4	100
Dixon	1	175
Edmundson	3	347
Holmsley	8	7,751
Ingram	1	45
Lena	3	116
Seay	6	1,514
Simpson	4	384
Sparks	7	5,694
Sullivan	3	560
Mid-Continent:		
McCumber	7	1,800
Mid-Kansas:		
Anderson	4	585
Phillips:		
Dunnaway	1	30
Graham	7	397
Prairie:		
Baker	1	50
Davis	4	1,525
Graham, C.	2	775
Graham, O.	4	3,920
Stidham	13	8,360
Roxana:		
Bayliss	1	1,137
Spencer	2	7
Shaffer:		
Clark	4	2,478
Sinclair:		
Foreman	1	15
Hollins	3	930
Sango	1	1,690
Skelly:		
Spencer	2	2,340
The Texas Company:		
Anderson	5	1,465
Brown	8	2,515
Rodgers	3	6,145
Wilmont	6	1,525
Tidal:		
Watkins	5	2,905
Twin State:		
Barker	4	205
Hearn	3	9,590
Total Earlsboro	278	172,051

Seminole

Carter:		
B. Carter	2	225
J. Carter	3	45
F. Carter	3	145
Creamer	2	30
R. Cudjo	4	400
W. Cudjo	2	20
Gilliland	2	375
Grisso, M.	1	0
Grisso, W.	5	1,075
Jackson	1	10
Knapp	3	238
Killing, M.	12	8,460
Killing, G.	4	765
Lukes	7	1,660
Ponder	2	60
Simpson	3	67
Strother	4	550
Vierson	3	425
Amerada:		
Fixico	4	1,068
Killing	4	404
Rentie	3	679
Atlantic:		
Cudjo, N.	3	611
Barnsdall:		
Carter	8	2,296
Henry	2	752
Jones	4	1,095
Empire:		
Gross	3	142
Wilson	2	378
Gypsy:		
Butler	3	395
Carter	8	560
Cudjo	5	593
Fixico	7	130
Harjo	3	608
Wolf	6	185
Independent:		
P. Fixico	3	310
Harjo	3	160
Independent & Garland:		
T. Fixico	8	1,020
Independent & Interocean:		
Jones	4	498
Indian Territory:		
Allen	2	215
Bowlegs	12	2,803
Fleet	1	10
Gooden	4	189
Harjo	4	256
James	4	227
Reed	3	20
Kingwood:		
Johnson	3	1,226
Magnolia:		
Born	1	35
Franks	4	824
Mid-Continent:		
Rentie	9	1,100
Tayeche	7	380
Mid-Kansas:		
Wilkins	1	275
Phillips:		
Strothers	2	102
Philmack:		
Butler	3	1,280
Prairie:		
Gross	5	130
Mason	1	110
Spencer	1	12
Strother	8	1,131
Pure:		
Strother A.	17	2,432
Strother B.	5	1,487
Strother C.	1	6
Roxana:		
Harber	2	290
Lashley	2	26
Sinclair:		
Carter	2	30
Cudjo, A.	6	996
Cudjo, B.	4	1,045
Dicey	2	1,686
Fixico	4	460
Slick:		
Cudjo	3	755
Franks	8	1,592
Giblet, Sam	3	2,586
Tiger	1	46
Superior:		
Cudjo	4	845
The Texas Company:		
Mayhue	1	310
Strothers	2	100
Tidal:		
Carter	4	754
Fixico	6	585
Harjo, D.	3	785
Harjo, T.	6	240
Mahardy	2	180
Tayeche	1	1
Turman:		
Cudjo	4	1,034
Grisso	1	136
Jones	4	982
Total	319	56,886

Searight

Carter:		
Davis	7	2,995
Frazier	6	4,615
Johnson	1	0
Kiker	1	30
Mandler	2	50
Scott	1	30
Amerada:		
Johnson	1	80
Strother	2	2,057
Gypsy:		
Cudjo	4	527
Mid-Continent:		
Grayson	6	575
Soloche	3	1,630
Pine:		
Lulla	1	6
Prairie:		
Cannon	1	10
Carter	1	25
Houck	1	5
Kincaid	5	85
Wiemer	1	20
Pure:		
Aldridge	6	4,567
Roxana:		
Strother		1,187
Sinclair:		
Polly	4	2,665
The Texas Company:		
Fleet	1	70
Twin State:		
Varnum		420
Wilcox:		
Chupco	8	4,000
Total	67	24,713
Total Little River	76	39,330
Total Bowlegs	284	122,886
Total Earlsboro	278	172,051
Total Seminole	319	56,860
Total Searight	67	24,713
Grand total	1,024	415,840

Beckham County

Cal Wright's No. 1 Traves, NW cor. SE SE, Section 30-9-23w, has been abandoned at 3,260 feet.

Carter County

Merrick & Camp's rig is up for No. 2 Denny "B," SE cor. NW SW, Section 20-1s-3w. Simpson & Fell's rig is being erected for No. 1 Crockett, NE cor. SE Section 22-1s-3w.

Caddo County

Moran and others' No. 1 Cutshall, NE cor. SE NW Section 5-5-9w, is pumping 80 bbls. from sand at 1,825-46 feet. Oklahoma Gas Utilities' No. 2 Farwell, SW cor. SE SE, Section 23-5-8w, was completed for 20,000,000 feet of gas in sand at 2,070-2,404 feet. No. 2 McCaughtry, NE cor. SW NW Section 35-5-8w, set 8-inch casing at 2,129 feet, drilled to 2,400 feet and gauged 35,000,000 feet of gas.

Grady County

Carter Oil Co.'s No. 4 McCaughtry, SW cor. NW NW Section 26-5-8w, is being deepened from 1,354 feet, having cemented pipe at 2,020 feet and drilled to 2,439 feet. No. 1 Tims, SW cor. NE Section 17-4-6w, is a rig up.

J. B. Nichols' No. 1-A Scott, NE cor. SE NE, Section 34-5-8w, had sand at 2,478-88 feet and is estimated making 15 bbls. John Graham's No. 1 Steelman, CNL NW NW Section 16-5-7w, has been abandoned at 3,201 feet. Rookstool and

It was Secretary Hoover who said that the oil industry should conduct its business with glass pockets

Especially so at this time

Universal Oil Products Company
Owner of the Dubbs Process
310 South Michigan Ave
Chicago, Illinois

others' No. 1 Kayser, C NW SE Section 3-4-8w, has been abandoned at 3,365 feet. Meridian Gas Co.'s No. 2 Ramsey, C SE NE Section 10-4-8w, is dry and abandoned at 2,575 feet. Marland Oil Co.'s No. 3 Burke, NW cor. SW, Section 16-3-5w, an old well deepened to 3,150 feet, has been plugged back to 2,425 feet and abandoned.

Hughes County

Winkler & McQueen have rig up and tools in for No. 1 Tyger, C SE SW, Section 31-5-9.

Winkler and others built the rig for No. 1 Tiner, C SE SW, Section 31-5-9. The Prairie Oil & Gas Co.'s No. 3 Hampton, NW cor. NE NW Section 20-8-10, is dry at 4,140 feet.

Jefferson County

Skelly Oil Co.'s No. 2 Ryan, SW cor. NE SE, Section 23-6s-6w, is rigging up rotary. Heydrick & Hivick made location for No. 1 Lahman, SW cor. SE NW, Section 17-7s-5w.

Muskogee County

P. Boyle and others moved a machine to the location for No. 4 Barnett, C NE SE, Section 8-15-15. A machine is also on the ground for No. 1 S. Lowery, CWL NW SW, Section 9-15-15. Denton & Marshall's machine is at the location for No. 3 Jefferson, NE cor. SE, Section 32-15-15. W. J. Metzger & Fultz moved the machine out for No. 1 Townlot, SW cor. SE, Section 34-15-18. Indian Capital Oil Co. has a machine on the location for No. 1 Smith, NW cor. SE NE, Section 7-14-19. Sioux Oil Co.'s No. 1 Bradshaw, SE cor. NW NE, Section 24-13-18, is spudding.

O. T. Gilbertson's No. 4 Cherry, CWL SW NW, Section 27-14-16, was completed for 50 bbls. in sand at 1,610-37 feet. J. L. Dixon's No. 4 Davis, SW cor. NW NW, Section 12-14-18, is good for 2,000,000 feet of gas in the Muskogee sand at 1,029-33 feet.

Creek County

H. U. Bartlett has the rig up for No. 1 McIntosh, NE cor. NW NW, Section 28-18-9. Continental Oil Co.'s No. 1 Strip, SW cor. NW NW, Section 25-18-11, is spudding. Burlingame & Sharp are rigging up a machine for No. 14 Miller, C SW NW, Section 13-19-8. Steinberger & Smith have the rig up for No. 2 Smiley, C NW NE, Section 19-19-8. Page Brothers made location for No. 3 Bishop, NE cor. SW SW, Section 13-17-8. Olean Petroleum Co. has built the rig for No. 1 J. Lewis, SE cor. NW, Section 10-15-8.

Henry Oil Co.'s No. 2 Unallotted, SE cor. SW SE, Section 1-17-10, is dry and abandoned in the Wilcox sand at 2,896-2,903 feet. Pontiac Oil Co.'s No. 10 Fulsom, NW cor. SW Section 13-17-10, drilled the Red Fork sand from 1,893 feet to 1,933 feet and made 170 bbls. after a shot. No. 1 Baker, SE cor. NE, Section 14-17-10, was completed for 75 bbls. after shooting the Red Fork sand at 1,893-1,938 feet. The Texas Company's No. 1 Strip, SE cor. NE, Section 2-16-11, is a dry hole at 2,706 feet in the Wilcox sand found at 2,694 feet. Independent Oil & Gas Co.'s No. 6 Wolfe, SE cor. NW NE, Section 18-14-10, was completed for 1,000,000 feet of gas in sand at 444-58 feet. C. O. Buckles and others' No. 1-A Cloud, SW cor. SE NE, Section 22-18-8, is dry and abandoned at 1,330 feet. Gibson & Becker's No. 2 M. Tiger, NE cor. SW NW SW, Section 17-17-7, produced a maximum of 300 bbls. from the Bartlesville sand at 2,768-80 feet. Peters Petroleum Co.'s No. 4 Arysalle, NW cor. SE NE, Section 21-16-8, made 140 bbls. from sand at 3,154-57 feet. Olean Petroleum Co.'s No. 5 McGilbra, SW cor. NE NE, Section 30-14-8, has been abandoned at 4,140 feet on account of a bad fishing job.

Kay County

Harris & Hahn's machine is moving in for No. 1 Bechtel, C NW SE, Section 22-29-1w. Carter Oil Co. and Ona Oil Co. made location for No. 6 Shimp, C SW SW, Section 17-29-1e. Greer & Walters' No. 1 Skein, C SE SW, Section 19-29-1e, is spudding. Blackwell Oil & Gas Co. made location for No. 3 Athey, SE cor. NE SE, Section 35-28-1w. Greer and others' No. 1 Lane, SE cor. NE NE, Section 30-28-1e, an old well, is rigging up to deepen. A machine has been moved out for No. 1 Koehler, C SE NE, Section 30-28-1e. Waggoner and others' No. 1 Fruits, NW cor. NE NE, Section 3-25-2w, is rigging up standard tools. Marland Oil Co. and Galt Brown Oil Co.'s No. 2 Miller, NE cor. SW, Section 9-25-2w, is a rotary rig under construction. The Prairie Oil & Gas Co. is rigging up a machine for No. 2 Pratt, NE cor. Section 30-27-1w.

Carter Oil Co. and Ona Oil Co.'s No. 5 Shimp, C NW SW, Section 17-29-1e, was completed for 21,268,000 feet of gas in sand at 1,435-70 feet. Blackwell Oil & Gas Co.'s No. 1 Whiteside, C SE SW, Section 25-28-1w, is dry and abandoned at 1,665 feet. Greer and others' No. 2 Lane, CEL W half NE NE, Section 30-28-1e, has been shut in for 450,000 feet of gas at 1,070 feet. No. 1 Naylor, CEL W half NW NE, Section 31-28-1e, has been completed for 200,000 feet of gas from sands at 840,865 feet and 1,040-55 feet, total depth 1,147 feet. Carter Oil Co.'s No. 3 Jameson, SE cor. NE, Section 17-27-1w, Blackwell district, is dry and abandoned at 3,655 feet.

Garfield County

Amerada Petroleum Corp.'s No. 1 Wilcox, SW cor. NE, Section 19-23-3w, topped the Wilcox sand at 5,390 feet, had best pay at 5,568-76 feet and made 60 bbls. Chappell and others' No. 4 Dively, C SW SE, Section 14-22-4w, is dry and abandoned at 2,420 feet. T. T. Eason and others' No. 1 Doak, CEL NE NW, Section 26-22-4w, has been abandoned at 2,395 feet.

Logan County

Texas Pacific Coal & Oil Co.'s No. 1 Speaks, SE cor. NW, Section 33-18-4w, Marshall area, produced 60 bbls. from sand at 4,134-44 feet.

Osage County

Galt Brown Oil Co.'s No. 2, NE cor. SW, Section 3-26-6, Burbank Pool, is a rig on the ground. Devonian Oil Co. made location for No. 3, SE cor. NE NE, Section 33-21-10.

M. M. Lefever's No. 14, SE cor. SW NW, Section 1-28-10, is dry and abandoned at 1,814 feet. Kewanee Oil & Gas Co.'s No. 9, SE cor. NE NW, Section 34-27-6, Burbank Pool, made 110 bbls. from the Burbank sand at 2,835-95 feet. George Parker's No. 2, NW cor. Section 11-26-6, is making 430 bbls. from the Burbank sand at 2,817-60 feet. Indian Territory Illuminating Oil Co.'s No. 383, NE cor. SE SE, Section 35-26-11, has been shut in for 4,500,000 feet of gas in the Burgess sand at 1,577-1,603 feet. George Tselos' No. 3, NW cor. SW NE, Section 11-24-11, made 15 bbls. after shooting the Bartlesville sand at 1,670-40 feet.

Noble County

Magnolia Petroleum Co.'s No. 1 Pearson, NW cor. SE, Section 15-21-2w, swabbed 20 bbls. from sand at 4,461-80 feet and made 6 bbls. on the pump.

Okfuskee County

Independent Oil & Gas Co.'s No. 1 Holmes, CWL NW NE, Section 30-11-11, Deaner-Lyons area, is dry and abandoned at 3,777 feet.

W. L. Umburn's No. 1 Tiger, NW cor. SE NW, Section 2-10-11, is drilling at 750 feet. The rig is on the ground for No. 2 Tiger, CNL NE NW, Section 2-10-11. Atlantic Oil Producing Co.'s No. 1 Robinson, C NW SW, Section 12-10-11, is drilling at 100 feet.

Cleveland County

Mid-Continent Petroleum Corp.'s No. 1 Woodrow, SW cor. NW, Section 20-8-1e, is dry and abandoned at 4,725 feet.

Okmulgee County

M. T. C. Oil Co.'s No. 1 Cooper's SE cor. SW, Section 25-16-13, is spudding. Papoose Oil Co. has a machine on the ground for No. 2 Francis, SW cor. SE, Section 25-16-13. Sunray Oil Co.'s No. 1 Cooper, NE cor. NW, Section 36-16-13, is drilling at 1,000 feet. Transcontinental Oil Co. and Schock erected the rig for No. 2 Deer, CWL NE SW, Section 9-15-13. Carr Peterson moved a machine to the location for No. 4 Ware, NE cor. NW SW, Section 9-15-14. Richardson and others' No. 4 Barnett, C SW SW, Section 6-14-15, is spudding. F. Henthorn's No. 6 Rentie, NE cor. SW NE, Section 18-14-15, is drilling at 900 feet. F. A. Roberts' No. 4 Rentie, CSL SE NW, Section 18-14-15, is shut down at 815 feet.

Farrell & Lavery's No. 1 Scott, NW cor. SE, Section 6-15-13, is making 33,000,000 feet of gas from sand at 2,083-2,102 feet. A. W. Cline's No. 1-A Rowe, NW cor. SW NW, Section 20-15-14, is dry and abandoned at 2,330 feet. J. L. Powell's No. 4 Thomas, CSL NE SE, Section 23-14-14, is a dry hole at 1,952 feet.

Pontotoc County

Homaokla Oil Co. made location for No. 7 McCall, SE cor. SW NE, Section 17-5-8, Allen Pool. The rig is up for No. 6 McCall, SW cor. NE, Section 17-5-8. Location has been made for No. 8 McCall, NW cor. NE SE, Section 17-5-8. American Oil & Refining Co.'s No. 1 Mercer, C E half SE, Section 8-4-6, is drilling at 100 feet. Max Westheimer has the rig material on the ground for No. 1 Milner, SE cor. Section 8-5-8. Louisiana Oil Refining Co. is building the rig for No. 8 Harjo, SW cor. Section 17-5-8. Location has been made for No. 7 Harjo, NW cor. SW SW, Section 17-5-8. The rig has been erected for No. 12 Perry, NE cor. Section 19-5-8. The rig is also up for No. 7 Perry, SW cor. NW, Section 20-5-8. Location has been made for No. 10 Perry, NW cor. Section 20-5-8. Whitney and others erected the rig for No. 2 Shields, SW cor. SE, Section 20-5S.

Homaokla Oil Co.'s No. 2 Watson, SE cor. NE SW, Section 33-5-8, is dry and abandoned at 1,560 feet. American Oil & Refining Co.'s No. 1 Miller, NE cor. SE SW, Section 27-5-6, is making 5 bbls. from sand at 1,865-69 feet. Homaokla Oil Co.'s No. 3 McCall, SW cor. SE NW, Section 17-5-8, has been shut in for 30,000,000 feet of gas from sand at 2,336-65 feet. No. 4 Milner, NW cor. SE SE, Section 17-5-8, Allen Pool, has been completed in sands at 2,498-2,503 feet and 2,509-43 feet making 70 bbls.

Rogers County

W. S. Hinman's No. 1 Washington, SE cor. SW, Section 8-21-16, is making 3,000,000 feet of gas from sand at 600-613 feet.

Stephens County

Owen & Woods' No. 7 Massey, CSL SE SW, Section 12-2s-8w, is drilling at 1,700 feet. Tom Medlin's No. 7 Taliaferro "B," SE cor. SW, Section 27-1s-8w, is drilling at 250 feet. Coline Oil Co.'s No. 3 Malechi, NE cor. NW NE, Section 31-1-8w, is rigging up rotary tools. Schermerhorn Oil Co. and others' rig is being built for No. 2 Shields, SE cor. NE SW, Section 13-1s-4w.

Owen & Woods' No. 6 Massey, CSL SE NW, Section 12-2s-8w, is pumping 117 bbls. daily from sand at 2,063-86 feet. Hupp & Duff's No. 2 fee, SW cor. NE, Section 34-1s-8w, is pumping 20 bbls. from sand at 1,722-25 feet. Ellis Drilling Co.'s No. 4 Nigh, SW cor. NW, Section 34-1s-8w, is flowing 200 bbls. from sand at 1,925-30 feet. Beard & Cobb's No. 1 Brigham, SW cor. Section 30-1s-8w, lost the hole at 2,200 feet and has been abandoned. C. R. Smith's No. 1 Peddycort, NE cor. NW NE, Section 25-1s-4w, had sand at 2,781-85 feet and plugged back to 2,800 feet and completed for 10,000,000 feet of gas. Magnolia Petroleum Co.'s No. 1 Bell, NE cor. SE SW, Section 13-1s-4w, produced 332 bbls. from a series of sands from 2,763 feet to 2,812 feet.

Pottawatomie County

Magnolia Petroleum Corp. made location for No. 2 Risenhoover, NE cor. SE NE, Section 14-7-4, Pearson Field. Gypsy Oil Co. and others' rig is being erected for No. 2 McGee, NW cor. SW NE, Section 23-7-4.

McCulloch Oil Co.'s No. 1 Scott, NE cor. SW, Section 2-9-2e, is dry and abandoned at 5,134 feet. W. B. Pine's No. 1 Hamlin, NE cor. SE SE, Section 27-9-4, has been abandoned in the Wilcox sand at 4,692 feet. Independent Oil & Gas Co. and Darby Oil Co.'s No. 1 Le Clair,

(Continued on Page 133)

GOOD FLOWING WELL AT OXFORD LIKELY TO START MORE DRILLING

By J. L. Dwyer
Staff Correspondent, Kansas Fields

The best well completed in the Oxford district of Kansas is owned by the Roxana Petroleum Corp., and is No. 1 Rothwell, in Section 14-32-2. This is a southwest extension of the pool, and the well flowing 100 bbls. and hour after a shot of 40 quarts will probably cause several new operations. Sand in the new well was 1,992-2,094 feet.

Coffey County

Sheedy and others' No. 3 Hanner, SW cor. SE SW, Section 11-23-13, is drilling at 400 feet. Sheedy and others' No. 2 Hanner, NE cor. SW SW SW, Section 11-23-13, was completed for 20 bbls. in sand 1,762-1,803 feet.

Little Martha Oil Co. moved a machine out for No. 1 Sandstrum, SW cor. Section 24-33-6. Shawver and others' No. 1 Myers, SE cor. SW NE, Section 29-30-5, is a dry hole at 2,356 feet. Wakefield and others' No. 1 Winfield Townsite, Lot 1 Block 41, is good for 800,000 feet of gas from sand 2,499-2,517 feet.

Elk County

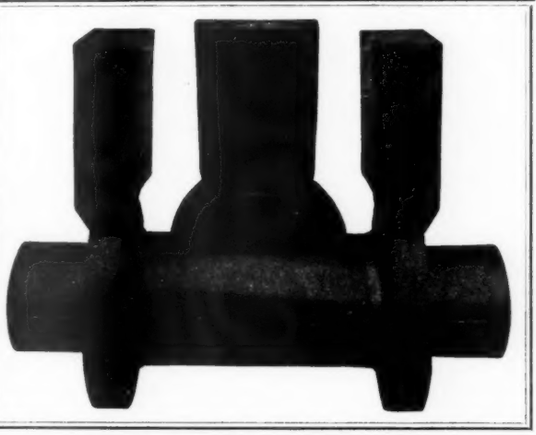
Watchorn Oil & Gas Co. made location for No. 10 Denton, SW cor. NW, Section 3-30-9. Elk Petroleum Co. made location for No. 1 Denton, NE cor. SE, Section 4-30-9. Elwood & Phoenix Oil companies moved a machine out for No. 1 Hugg, NE cor. Section 22-30-10. Hood & Co.'s No. 2 Eyman, CNL SE SE, Section 9-31-10, is drilling at 300 feet. Denman others' built the rig for No. 1 Lewis, SE cor. Section 35-31-10.

Greenwood County

Empire Oil & Refining Co. has the rig on the ground for No. 18 Duby, NW cor. SE SW, Section 14-22-11. The rig is being built for No. 4 Garth, SW cor. NE NE, Section 24-22-11. Theta Oil Co. has the rig up for No. 2 Fankhouser, SW cor. SE SE, Section 23-22-12. Empire Oil & Refining Co. has erected the rig for No. 5 Demler, NE cor. Section 25-22-12. The rig material is on the location for No. 6 Demler, NW cor. NE NE, Section 25-22-12. The rig is under construction for No. 3 Schwab, SE cor. NE NE, Section 25-22-12. Rig material has been hauled out for No. 4 Schwab, SW cor. NE NE, Section 25-22-12. The rig is also on the ground for No. 2 Ott "B", NW cor. NE NE, Section 26-22-12. Culp and others' No. 1 Smith, C NE SE, Section 28-27-13, is rigging up.

Theta Oil Co.'s No. 1 Fankhouser, SE cor. Section 23-22-12, had sand 1,670-3 feet, total depth 1,705 feet and made 320 bbls. after the shot. Empire Oil & Refining Co.'s No. 3 Demler, NE cor. Section 25-22-12, made 360 bbls. after shooting sand 1,681-1,735 feet. No. 4 Demler, NE cor. Section 25-22-12, made 50 bbls. from sand 1,684-98 feet, total depth 1,740 feet. No. 4 Ott, NE cor. NW NW, Section 25-22-12, produced 400 bbls. after a shot in sand 1,682-1,717 feet. Darby Petroleum Corp.'s No. 1 Schwab, SW cor NW NW, Section 30-22-13, was shot with 220 quarts and made 300 bbls. from sand 1,690-1,748 feet, total depth 1,751 feet. Federal Oil Co.'s No. 2 Storrer, NW cor. Section 30-22-13, is dry and abandoned at 1,778 feet. Shaffer Oil & Refining Co. & Howell's No. 1 Schwab, Lot 5 North, NE cor. Section 30-22-13, is a dry hole at 1,875 feet. Lasson and others' No. 2 Wilkerson, SW cor. NE NW, Section 7-25-9, made a 25 bbl. well in sand 2,258-88 feet. Cross and others' No. 1 Brown, NE cor. SE, Section 15-25-13, is dry and abandoned at 1,657 feet. Ballard and others' No. 1 Fair Grounds, NE cor. SE NE, Section 2-26-10, has been abandoned at 2,076 feet. Wahn and others' No. 1 Westphal, NE cor. NW NW, Section 2-26-10, has been abandoned

(Continued on Page 132)



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Iles Dome Has Best Well in Morrison

Indicates That Moffat County, Colorado, May Develop a Major Pool—Edge Not Yet Found

By Tolbert R. Ingram
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., Dec. 3.—Colorado occupies the center of the stage this week so far as operations in the Rocky Mountain area were concerned, with several important developments. The Midwest Refining Co.'s No. 4-SD Shaw on the Iles Dome in Moffat County, made 1,040 bbls. of 31 gravity oil from the Morrison sand in a 24-hour test, this being the best well so far completed in that horizon. Water was found in the Sundance at 3,926 feet in the Texas Production Co.'s Rangely Dome test, and two new tests in important wildcat territory were announced. One of these will be drilled by the Phillips Petroleum Co., and others, in the center of the much-discussed southeastern Colorado territory, and the other will be a deep test in the Denver Basin 60 miles east of Denver. Oil was found in the Frontier for the first time in Colorado in the Continental Oil Co.'s No. 1 Hoye in Jackson County, and water was found in the Dakota in the Northeastern Colorado Oil Co.'s test on the Willard Dome in Logan County. Several good wells were completed in the Florence district in Fremont County.

In New Mexico, the Texas Production Co. is abandoning its No. 1 Lockhart in southeastern Lea County at 4,507 feet, it being a dry hole. The Inglefield & Bridges' No. 1 State in Lea County, also was abandoned. Empire Gas & Fuel Co. has a 10-bbl. well in Eddy County in its No. 4-A Russell. Chaves County had one abandonment in Lane, and others' No. 1 U. S., and W. C. Wells' No. 1 State in Eddy County, was abandoned.

In Wyoming, one completion was reported in Salt Creek, the Wyoming Associated having a 42-bbl. well in the Wall Creek, and in the LaBarge district, the California Petroleum Corp. had a 50-bbl. well. Producers & Refiners Corp. found water in the Embar in its test on the Tensleep Dome in Washakie County, and is going on down. Oregon Basin and La Barge show considerable activity with most of the wells drilling.

Utah reported little of interest outside of the routine drilling.

Colorado

Colorado had more than its share of interesting developments this week, one of the most important being the completion of the Midwest Refining Co.'s No. 4-SD Shaw, NE NW NE Section 27-4n-92, on the Iles Dome in Moffat County, a joint well with the Yarg Producing & Refining Co. This is one of the series of wells started to the Sundance sand below the Dakota following the discovery of a new producing horizon in that formation in the Midwest's No. 21-SD on the SE Section 22-4-92 last April. Between the Dakota and Sundance all of the wells have found oil or gas, or both, in sands in the intervening Morrison formation. Out of the five Sundance tests started, only two have reached that horizon, the others finding the pay in the Morrison. The Midwest's No. 4-SD Shaw is the last of the five tests to reach the pay and it has developed into the best Morrison sand well so far drilled and comparable with the discovery in the underlying Sundance which made 2,600 bbls. initial. The Shaw well entered the first Morrison sand at 3,236 feet and was drilled 40 feet to 3,276 feet, developing a flow of 15,000,000 feet of dry gas. At 3,276 feet it broke through a hard shell and commenced making oil. It flowed 662 bbls. in 13 hours and was then beaned down to a five-eighths-inch choke and in 3 hours flowed 151 bbls. with a back pressure of 620 lbs. and a line pressure of 210 lbs. On a 24-hour test it put 1,041 bbls. into the tanks. The oil is 31 gravity. The location is one-fourth mile south of the discovery well in the Sundance. Gas only was found in the Morrison in the discovery, the oil coming from the Sundance. The well will be completed for the present at 3,276 feet.

The No. 4-SD Shaw well is on the lowest contour of any of the five wells started to the Sundance. Its performance indicates that it is some distance away from the edge of the productive area and gives emphasis to the belief that this is going to be a major pool. Already it gives evidence of having the largest productive area of any pool in the Rocky Mountain district with the exception of Salt Creek in Wyoming, and the Kevin-Sunburst Field in Montana, the latter, however, being very spotted. Between 800 and 1,000 acres have been proven up and the edge has not yet been found on any side.

To Extend Line

Last week it was announced that the Midwest Refining Co. would extend its 4-inch line from the Iles Dome to the Moffat Dome on into Craig, a distance of 16 miles, giving it its own line from Iles to a railhead. The Texas Production Co. has decided to build its own line from Iles to the Moffat Dome, and this will give it its own line from both pools. The Midwest has started work on its line and The Texas Company will begin work as soon as equipment can be moved.

The drilling wells on Iles are making fair progress. Midwest Refining Co.'s No. 34-SD Parkinson, SE SW Section 22-4-92, which had 11,000,000 feet of gas in the Morrison topped at 3,052 feet, is lubricating at 3,110 feet to kill the gas so it can be drilled on down to the Sundance. Same company's No. 8-SD Parkinson, NW NW Section 23-4-92, is drilling at 200 feet. Shaffer Oil & Refining Co.'s No. 205 Yarg, a joint operation with the Yarg Producing & Refining Co., is drilling at 1,300 feet. Texas Producing Co.'s No. 17 Parkinson, NW SW Section 23-4-92, is running tubing to pump. This well is flowing 400 to 500 bbls. a day from the Morrison between casings and at last reports was almost full of oil from the Sundance in the 4½-inch casing. Same company's No. 13 Parkinson, NE SW Section 22-4-92, has completed rig, but has not spudded, waiting for crew to be released from one of the other wells. Same company's No. 6 Parkinson, NW NW Section 23-4-92, is drilling in shale at 2,500 feet. L. L. Keith's No. 1 Milliken, SW cor. Section 14-4-92, is rigged and ready to spud.

The Iles Pool produced 34,439 bbls. in October, compared with 15,610 bbls. in September. The field at present would probably produce 5,000 bbls. a day from the six wells if opened to capacity.

The Moffat Dome, 6 miles northeast of the Iles Dome, is now being closely watched. The Texas Production Co.'s No. 10 Knowlton, Section 33-5-91, which had water in the Dakota, is being drilled down to the Sundance. It had about 200 bbls. a day in the Morrison and was believed to be in the top of the Sundance at 4,415 feet. A check of the geology showed, however, that this was still in the Morrison and drilling was resumed. It is bottomed at 4,388 feet and feeling for the Sundance.

Shut In For Winter

On the Hiawatha Dome in northern Moffat County, the Ohio Oil Co.'s No. 1 Kuykendall, Section 22-12-100, has been shut in for the winter at 2,008 feet. No gauge of production will be made until spring, but its capacity is estimated at 35,000,000 feet a day. Reiter-Foster Oil Co.'s No. 1 State, Section 16-12-100, is bottomed at 2,065 feet and underreaming to lower the 6¼-inch casing. The sand is expected at 2,165 feet and the 6¼-inch will be cemented before drilling in. It had a show for half a barrel of oil below a 15-foot sand topped at 1,960 feet.

Rangely Dome in Rio Blanco County, yielded a disappointment this week in the Texas Production Co.'s No. 2 Emerald, Section 31-2n-102. It topped the Sundance at 3,926 feet and the hole filled with water. The sand topped at 3,673 feet proved subsequently not to be the Sundance as believed at the time. It will be plugged back to 3,570 feet and completed as a gas well. It had 13,000,000 feet of gas in the Morrison sand topped at 3,550 feet. Midwest Refining Co.'s No. 2 Rangely, Section 30-2n-102, is still lubricating to kill the gas at 3,091 feet. This gas is in the Dakota formation.

On the Wilson Creek Dome, in Rio Blanco County, the Texas Production Co.'s No. 1 Freeman, Section 27-3n-94, is drilling in shale at 5,155 feet. The hole has 700 feet of water in it probably coming from the Frontier formation, but the geologists have not yet decided as to the identity of the horizon. If this horizon proves to be the Frontier, the test still has 450 to 600 feet to go to reach the objective Dakota.

Important Tests

Location of an important test in southeastern Colorado has been made by the Phillips Petroleum Co. in the NE Section 23-29s-56, on the Red Rock structure in Las Animas County, the footage being 330 feet south of north line and 1,300 feet west of east line. This is to be a joint well with the Reiter-Foster Oil Co., with the Texas Production Co. contributing towards the cost. The well starts below the Dakota, which is eroded and approximately 1,000 feet lower than any test drilled in that general area. It will be a test to the Pennsylvania and agreements call for a 3,500-foot hole if necessary. The location is such that it is expected to throw more light on the geology of southeastern Colorado than any well so far drilled in that general area. The structure has been known for a number of years and two tests were drilled in 1920 and 1921 on Sections 17 and 32-29-56, one being abandoned at 1,871 feet and the other at 1,570, and both drilling all the way in the red beds.

Another important test is being started near Godfrey, or Buick's Switch as it is sometimes called, in Elbert County, 60 miles east and a little south of Denver in the heart of the Denver Basin. One of the best outfits in the state has been constructed, the derrick being double braced, there being double boilers, with rig and equipment enclosed for winter drilling, and an extensive camp having been completed. A water well has been drilled, 20-inch casing and bits are on the ground and fuel oil is being hauled to the location. Identity of the interests behind the operation has not been disclosed but it is said that J. W. Botts, president of the Marine Paint Co., of San Francisco, is representing the parties and that the Robert Dollar steamship interests are back of the project. There is a long story back of this operation which is worth a story all by itself. Four or five wells have been drilled to a shallow depth in that general region based on the log of a well drilled to around 700 feet more than 60 years ago by the Kansas Pacific railroad for water. Striking oil, the site for the station was moved and the old landmarks were gone until the log of the well was dug up in Pennsylvania.

Show in Wildcat

The Continental Oil Co.'s No. 1 Hoye, SW NE Section 34-9n-78, on the South McCallum Dome, in Jackson County, is proving to be a wildcat operation of more than ordinary interests as a result of the excellent show of oil and gas encountered the past week in what is believed to be the Frontier formation from which the Salt Creek Field in Wyoming is yielding its principal production. This horizon has never proven commercially productive in Colorado. In northwestern Colorado it has generally been found water bearing while on the east side of the mountain range the sand is badly broken up and includes considerable shale. In fact, it was so poorly defined in some wells that it was hard to identify it. The Hoye well is midway between the Wellington-Fort Collins operation on the eastern side of the mountains and the Moffat County operation in northwestern Colorado, being about 60 miles distant in both directions. It is now drilling at 4,210 feet with the 8¼-inch at 4,130 feet. It commenced showing some gas and oil at 3,940 feet and the quantity had increased considerably at 4,130 feet. An additional 5 feet resulted in the oil coming up in the hole but it did not flow. A swabbing test was made, but the results were not made public.

The very fact that oil in any quantity was found in that horizon is considered very encouraging and makes the sands in the Dakota, which are the objective of the drill, very attractive. The Dakota is usually found 400 to 600 feet below the Frontier, but whether the interval is greater or lesser on the South McCallum Dome remains to be determined since an unexpected thickening of the beds was found on the North McCallum Dome where the Continental brought in its freak well in the Dakota at 5,100 feet. The hole is in excellent condition for a deep test and unless sufficient production is found in the upper sands of the Dakota to warrant stopping, it probably will be carried through all of the sands in that formation. It is about 5½ miles south and east of the discovery well on the North McCallum Dome. Other Jackson County operations show nothing out of the ordinary. Continental Oil Co.'s No. 1 Peterson, Section 1-9-79, on the north dome, is drilling at 3,900 feet and No. 1 Pollock, Section 2-9-79, is drilling at 4,100 feet. Both of these wells have 1,000 feet or more to go.

The Crude Oil Detector Co.'s No. 1 Hunter, Section 31-11n-79, near Cowdray, has suspended drilling for the winter. At last reports it was bottomed at 3,504 feet. North Park Oil Co.'s No. 1 Goettler, Section 9-6n-82, on the Crosby Draw Structure, a shallow test at which the Dakota is expected at 700 to 800 feet, is believed to be on the caprock and is underreaming to lower casing. It had a show at 430-70 feet.

The Northeastern Colorado Oil Co.'s No. 1 State, Section 36-8n-55, on the Willard structure, in Logan County, encountered a flow of artesian water in a hard white sand at around 5,328 feet. The sand was topped at about 5,317 feet and was dry at the top. The quantity was not sufficient to stop drilling and at last reports the hole was believed to be passing out of the sand at 5,371 feet. This sand is believed to be the true first sand in the Dakota, the one cut at 5,207-30 feet now being considered a stray member of the Dakota series and not a true sand since it contained a large percentage of shale. While the test is deep, and the hole reduced to 4 inches, it is still hoped that it can be carried down to test the other sands believed to be in close proximity to the drill. The log does not appear to correlate very closely with

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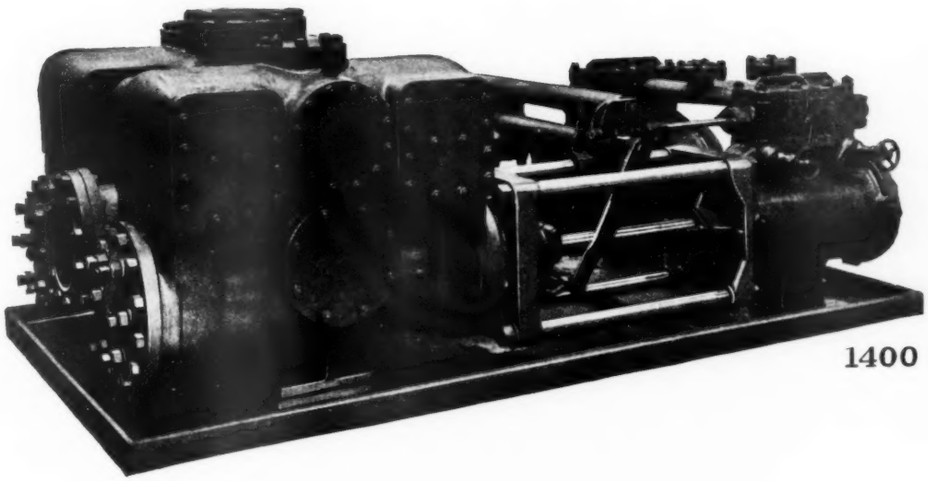

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the logs of wells drilled nearer the front range of the mountains.

The only other wildcat drilling in the general area of northeastern Colorado is the Platte Valley Petroleum Co.'s No. 1 Patterson, Section 24-6n-61, on the Greasewood Dome in Weld County. It had a show of oil and gas with salt water in a sand at 3,200-85 feet. A shutoff was made with the 6¼-inch casing and drilling is in progress below 3,625 feet. Little is known concerning the horizons being cut as the company appears disinclined to give out information. It had some water at 1,261 feet and at a lower depth had a show more like an oil residue than petroleum.

Wellington Field

The Wellington Field in Lamar County, where the Union Oil Co. of California is the sole operator, is showing increased activity and yielded an interesting development the past week in that company's No. 1 Plummer, Section 30-10n-68. This well came in last year as a water well in the Muddy sand at 4,468 feet and was drilled to 4,562 feet. Its location on the structure was such that it was expected to be either an oil well or a gas well, and the water came as a surprise. It was put on the pump to see what it would do and after pumping water for a month it began making about 3 bbls. of oil. This continued to increase until in March, 1927, it was making around 329 bbls. of pipe line oil. A month later the quantity of oil had increased to 432 bbls. with 380 bbls. of water. It was a consistent producer until a few weeks ago when it became necessary to shut down for a few days. When pumping was resumed, it had gone completely to water, making 800 bbls. of water a day. The oil commenced coming in again and it is now making 360 bbls. of oil. The results were so unusual that the company has started a pumping test on its No. 3 Buckeye, on Section 31-10-68, which came in as a water well at 4,473 feet after being deepened to 4,552 feet.

The Wellington-Fort Collins Pools are now producing around 3,300 bbls. daily, the oil being sold to the Midwest Refining Co. at Mid-Continent prices. Another completion is due shortly in the Union's No. 6 Buckeye, NW NE Section 31-10-68, which is drilling below 4,200 feet with the Muddy sand expected at about 4,400 feet. All the wells on the two structures which came in as producers are still making oil with the exception of No. 1 Blunck, Section 30-8-68, on the Fort Collins Dome, which has been off production for some time. This well is being deepened to the lower sands as a test of those horizons. The only other drilling well is No. 2 Foster, NE SW Section 30-10-68, on the Wellington Dome, a joint operation with the Texas Production Co. It is running casing at 2,030 feet. Derricks are being erected for No. 1 K. W. & B., SW NE Section 19-8-68, on the Fort Collins Dome, and No. 7 Buckeye, SE Section 31-10-68, on the Wellington Dome.

Florence Pool

Several good completions are reported in the west extension of the Florence Pool in Fremont County, where all the production comes from the Pierre shale. Continental Oil Co.'s No. 2 Melvina Steinmier, NW NW Section 2-19-70, was completed at 1,641 feet with an initial production of 180 bbls. Same company's No. 1 Francis Hall, has been deepened to 1,910 feet and production increased, but has not been tested. W. F. McCormick and the Bent County Oil & Gas Co.'s No. 2, Section 3-19-70, has been completed at 1,530 feet, and made 251 bbls. initial, one of the best wells in the new extension. In fact this well is an offset to No. 1 drilled by the same interests which marked an extension of the pool nearly a mile towards the southwest. Continental Oil Co.'s No. 1 Robbins, SW NE Section 3-19-70, in the same area, is drilling. Location of this well was incorrectly reported last week to be in Section 30, 5 miles to the southwest. In the south extension of the same pool, Henry Dickason's No. 2 Hass'er, NE Section 21-20-69, encountered the pay at 830 feet, but will be drilled deeper.

In the southwestern area, the Coon-Cotton Syndicate's No. 1 Hall, Section 9-35-15, on the Mancos Dome, in Montezuma County, is shut down at 1,240 feet in shale waiting for new drilling line. It is supposed to be about 100 feet above the Dakota. Detroit Oil Association's No. 1 Olbert, Section 9-35-12, Thompson Park district, is bottomed at 1,375 feet where it had some water said to be in the Mancos shale above the Dakota. A string of 1,450 feet of 5⅜-inch casing is on the ground ready to be run when necessary. Reports from Dolores County are that the Moody Oil Corp.'s No. 1, Section 30-14-16, on the Glade structure in Dolores County, is barren at 3,800 feet and that Geologist Mills, of the Transcontinental Oil Co., which has an interest in the well, has recommended that it be abandoned.

New Mexico

Another disappointment was registered the past week when the Texas Production Co.'s No. 1 Lockhart, SE cor. SW Section 5-22-38, near Eunice, close to the eastern line of Lea County, stopped drilling at 4,507 feet and is being plugged and abandoned. The hole was dry and nothing of consequence was found from top to bottom except some rainbow colors at 4,326-32 feet. The location is about 25 miles north of the same company's No. 1 Rhoades gas well. The Lockhart well was considered very favorably located on a high as disclosed not only by the surface geology but by the use of geophysical instruments. It topped the salt at 1,630 feet and bottomed it at 2,765 feet. The lime was topped at 3,758 feet, 3,371 feet above sea level.

The Inglefield & Bridges' No. 1 State, Section 4-17-34, in Lea County, is being abandoned at 5,329 feet. It ran into salt water at 5,325 feet, bailing about 6 bbls. per hour. It showed for a 12 to 15-bbl. producer at a level above the water, but this was not considered commercial. Maljamar Oil & Gas Co.'s No. 2 Beardsley, SE NE Section 15-17-32, is drilling at 3,790 feet. Midwest Refining Co.'s No. 1 State, NE Section 9-19-38, near Hobbs, is drilling in red shale at 750 feet. Bordages' No. 1 Hughes, Section 27-19-38, is drilling below 500 feet.

Eddy County

In Eddy County, Getty Oil Inc.' No. 1 Hinkle, NE NE Section 23-20-29, which was shut down at 1,372 feet with hole full of oil awaiting instructions, is still idle. Pueblo Oil Co.'s No. 1 Gessert, NW NE Section 1-17-31, is still fishing at 3,705 feet, with two strings of tools in the hole. Same company's No. 2 Yates, SW SE Section 33-17-28, was given another shot with 60 quarts at 2,136-45 feet. Its initial production was 10 bbls. after being cleaned out. R. D. Compton's No. 4 Mann, SW NW Section 4-18-27, is drilling below 1,450 feet. Empire Gas & Fuel Co.'s No. 4-A Russell, SW SE, Section 35-17-27, has been completed at 1,623 feet with an initial production of 10 bbls. It was shot with 70 quarts at 1,604-19 feet. Flynn, Welch & Yates' No. 55, NW NE Section 32-18-28, is drilling below 500 feet. Levers & Carper's No. 5 State, SE NW, Section 3-18-28, is drilling at 1,700 feet. It cut the red sand at 1,543-75 feet. Texas Production Co.'s No. 2 Robinson, NW SW Section 25-16-31, is running 8¼-inch casing at 3,800 feet. W. C. Wells, and others, No. 1 State, SE NW Section 19-20-30, was abandoned at 1,690 feet in hard gray lime. It spudded in 1925.

In Chaves County, Lane and others' No. 1 U. S., NW SW Section 24-11-25, has been plugged and abandoned. Total depth was 1,252 feet. This was an old well drilled deeper. McQuigg & McQuigg's No. 1 Neis, Section 7-5-29, is shut down for 10-inch casing at 975 feet with hole full of water. Corrected location on this well is center of NW of the section.

In Quay County, Ohio Oil Co.'s No. 1 Jordan Ridge, Section 24-7-29, is drilling at 4,366 feet.

In McKinley County, in the northwestern part of the state, the Continental Oil Co.'s No. 1 Carica, SW Section 9-17-7, is running 6⅝-inch casing at 1,720 feet. Total depth, 2,645 feet. Producers & Refiners Corp.'s No. 2, Section 12-17-9, Hospah Dome, is bottomed at 1,767 feet and underreaming to lower the 10-inch casing.

In San Juan County, Continental Oil Co.'s No. 17 Santa Fe, Section 2-29-19, Rattlesnake Dome, cemented the 8¼-inch casing at 3,785 feet. J. Warren Miller's No. 1 Markley, NW NW Section 16-29-13, near Farmington, passed through the Picture Cliff formation at a little below 1,300 feet and failed to encounter gas. Hole is being plugged. Well was drilled in hopes of developing a gas supply for the town of Farmington. Huntington Park Oil Co.'s No. 1, SE SW Section 29-30-9, in the Blanco district, is running 5 3-16-inch casing. Hole is bottomed at 4,150 feet, probably in the top of the Mesa Verde and was making 100,000 feet of gas when shut down to case.

Wyoming

Wyoming reported one completion for the week, this being the Wyoming Associated's No. 18 in the SE Section 14-40-79, which made 42 bbls. initial from the Wall Creek at a total depth of 1,420 feet. California Petroleum Corp.'s No. 3-D, Section 3-26-113, in the La Barge Field in Sublet County, reported a completion at 910 feet last week but not tested, made 50 bbls. initial when put on the pump.

The Producers & Refiners Corp. has closed a deal with the Hughes Royalty Co. for the purchase of the gas developed on the latter's holdings on the Mahoney Dome in Carbon County. One well has been completed on these holdings with a production of 1,500,000 feet a day. A line from the well to the main line has been finished and the well will be put on production at once.

Prairie Oil & Gas Co.'s No. 1 Tucker, Section 18-13-99, on the Alkali Creek Dome in Sweetwater County, just north of the Hiawatha operation in Colorado, has been shut down for the winter at 510 feet. Water was encountered at that depth and it is possible the rig will be skidded in the spring and the hole saved for a water supply. This leaves the Prairie with only one active operation in Wyoming at this time this being its No. 7-B, Section 14-26-90, in the Lost Soldier district, which is drilling at 1,210 feet. An effort is being made to complete this well before winter sets in. The Producers & Refiners-Marland joint No. 1, Section 26-20-104, on the North Baxter Basin Structure, is bottomed at 485 feet where the 20-inch was set, while a water well is being drilled.

In Fremont County, the Zola Oil Co.'s No. 1, SW NE, Section 25-27-93, west of the Lost Soldier Field, has cemented casing at 3,530 feet. This company and its predecessors have been making a determined effort for several years to open up a discovery in that area which lies on the boundary between Fremont and Sweetwater Counties. Producers & Refiners No. 1 Hudson, in the Lander district, an old producer being deepened, is drilling in lime at 1,425 feet. Texas Production Co.'s No. 1 Alkali Butte, Section 1-33-95, has overcome crooked hole which developed at 35 feet, and is drilling at 430 feet.

In Washakie County, the Producers & Refiners' No. 1 SE cor. NW Section 13-14-92, on the Tensleep Anticline, after running the 10-inch casing at 3,025 feet, ran into a white water sand and was still in the sand at 3,165 feet. This probably is the Embar. The test is being carried on down to the Tensleep. This is the only active operation in the county, the Ohio Oil Co.'s three operations on the Hidden Dome being shut down, one at 750 feet, another at 2,790 feet, and the other being rigged up, but not spudded. On the Black Mountain Structure on the boundary between this county and Big Horn County, the Utah Oil Refining Co. has one well drilling in

(Continued on Page 123)

NEW TESTS PLANNED IN NOVA SCOTIA; ROYALITE PRODUCTION INCREASING

By Victor Lauriston

Staff Correspondent, Canadian Fields

CHATHAM, Ontario, Dec. 3.—In the province of Prince Edward Island, the Henry L. Doherty Co. has definitely abandoned drilling operations on Governor's Island, opposite Charlottetown Harbor. The drilling outfit has been shipped to the Pincher Creek district, southeastern Alberta. The Doherty company put down two tests on Governor's Island, which, after a careful preliminary survey, was regarded as one of the most promising locations in the entire province. No. 1 test had to be abandoned last year on account of caving after it had been drilled to something over 1,200 feet. Doherty's No. 2 test, located close to No. 1, was spudded in las summer. This test was carried to a depth of 5,965 feet without leaving the sedimentary formations, and at this depth was abandoned because the casing was not sufficiently large to permit deeper drilling. The test at the time it was discontinued was the second deepest hole in Canada, the deepest being the British Dominion Oil Corp. test in the Turner Valley Field, which is now standing at 6,060 feet.

The Henry L. Doherty Co. commended its Prince Edward Island operations after securing from the provincial government a lease covering practically the entire potential oil and gas area of the province. It is understood that the lease called for the drilling of at least three tests to a depth of 5,000 feet or more. No information has been given out as to whether the Doherty company would surrender the lease, or later undertake further drilling operations. Doherty No. 2, which was one of the most remarkable and best handled deep tests ever drilled in Canada, was in charge of Hugh MacKay of Sapulpa, Okla., who will now handle the Doherty drilling operations in southern Alberta.

Tests Nova Scotia

It is reported that the Doherty interests are undertaking a new test in the province of Nova Scotia, on Pictou Island, where a promising anticlinal dome has been mapped. Imperial Oil, Ltd., is reported to be also interesting itself in Nova Scotia oil possibilities, and is stated to have geologists going over an extensive area in the Joggins tract of Cumberland County, where it is understood a test will be put down. In the Inverness area, in Cape Breton, the Gulf Oil Co. has been doing some geological work, and is reported to have shipped some large-sized casing to Margaree and Mabou, in preparation for a test. Though there has been a little drilling in Nova Scotia, no commercial oil production has yet been found by drilling; but stellarite deposits near New Glasgow were successfully used for oil production some 70 years ago. According to the most recent geological reports, the Pictou and Cape Breton areas give a reasonable possibility of commercial oil.

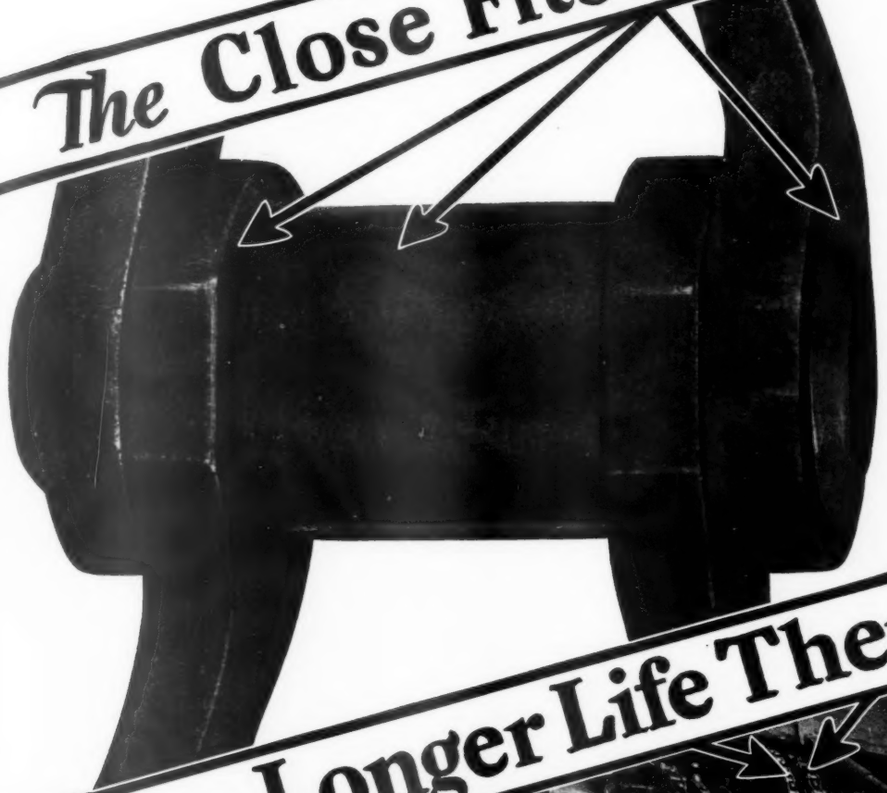
In the Canadian West, the Royalite Oil Co., producers in the Turner Valley Field, southwest of Calgary, indicate a further increased production. Official figures of the crude naphtha production of Royalite Nos. 1, 2, 3 and 4 for the week of November 15 to 22 show an average of 667.5 bbls. a day, an increase of 42 bbls. a day over the previous week. The total production for the week measured by actual deliveries to the pipe line was 4,672.9 bbls. This figure does not include Royalite No. 7, which has just been placed on the pipe line, but regarding whose production (unofficially estimately at 100 bbls. a day) no definite figures are yet available.

Increased Production

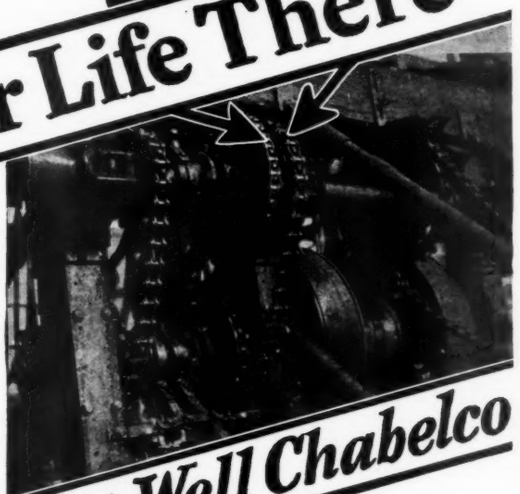
Figures so far available indicate that Alberta's crude oil and crude naphtha

(Continued on Page 123)

The Close Fits Here



Mean Longer Life There



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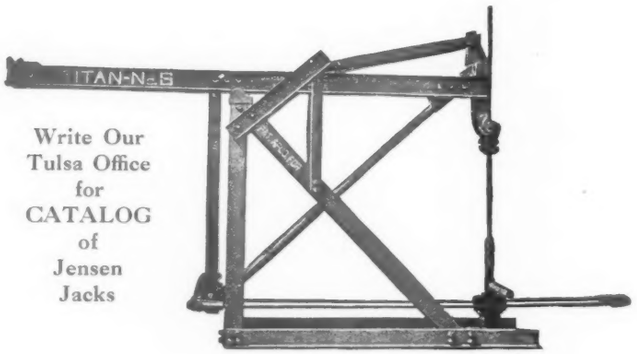

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Spindletop Features the Gulf Coast

Four Additional Producers Add Nearly 10,000 Bbls. of Initial Daily Production to That Pool

By Neil Williams
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., Dec. 5.—For the second consecutive week, the Spindletop Field featured Gulf Coast operations with four additional good producers adding nearly 10,000 bbls. of initial daily production to that pool. The previous week three good wells were completed with a total initial daily production of 5,400 bbls. This is a total of nearly 15,400 bbls. production to that field in two weeks.

The new wells during the previous week were largely responsible for the increase of 2,390 bbls. in daily average production the past week at Spindletop and also for the gain of 3,998 bbls. in the total daily output for the entire Gulf Coastal territory. Unless offset by unusual declines in other fields, a still greater substantial gain in daily average production is forecast for the coming week by the new production of the four additional good wells.

The past week was the first week since the last week in October that production in the Gulf Coast has reflected a decline and that week the gain was comparatively slight. Daily average production in the entire Gulf Coastal territory for the past week, ending December 3, was 141,356 bbls.

Daily average production in the majority of Gulf Coast fields was more or less steady with Pierce Junction of Harris County, Texas, and Lockport of Calcasieu Parish, Louisiana, reflecting any particular changes outside of Spindletop. Production in East Central Texas fields dropped 346 bbls. while that in Southwest Texas was virtually unchanged with only an increase of 31 bbls. being recorded. Daily average production by fields for the week ending December 3 was:

Gulf Coast	
Spindletop	50,778
Saratoga	1,092
Batson	1,246
Goose Creek	7,541
Sour Lake	3,916
Hull	13,499
Big Creek	2,519
Columbia	9,050
Humble	4,552
Pierce Junction	14,011
Blue Ridge	4,369
Markham	256
Orange	4,221
Damon Mound	810
South Dayton	230
South Liberty	2,116
High Island	30
Moores Field	33
Boling	2,312
Nash Dome	1,746
Barbers Hill	1,000
Vinton	4,903
Starks	284
Edgerly	2,172
Evangeline	1,204
Lockport	6,222
Sulphur	300
Hackberry	950
Total this week	141,356
Total last week	137,358
Increase	3,998
East Central	
Mexia	8,890
Cedar Creek	1,235
Nigger Creek	1,430
Currie	559
Wortham	2,400
Richland	678
Powell	13,453
Total this week	28,645
Total last week	28,991
Decrease	346
Southwest	
Somerset	2,335
Lytton Springs	1,634
Dale	414
Luling	14,896
Miscellaneous	9,095
Total this week	28,374
Total last week	28,343
Increase	31

The largest Spindletop well brought in the past week was Sun Oil Co.'s No. 17 McLean, flowing 3,256 bbls. daily from a total depth of 4,985 feet. Yount Lee Oil Co.'s No. 46 Gladys City started flowing at the rate of 3,000 bbls. daily from sand at 3,170 feet. The other two wells were Sun Oil Co.'s No. 16 McLean, flowing 2,200 bbls. from the 5,075-foot level, and Yount Lee Oil Co.'s No. 47 Gladys City, good for 1,500 bbls. daily from a shallower sand at 2,762 feet.

Other completions in Gulf Coastal territory were of little importance. The Hull Field of Liberty County added two pumpers; two producers were completed at Blue Ridge making a total initial production of around 1,000 bbls.; a Big Creek well is flowing 250 bbls. of net oil daily; Goose Creek added two small pumpers; Saratoga one small pumper, and the Brenham district one.

There were no completions in Louisiana Coastal territory but two abandonments, not previously reported, were recorded. One of these was in the Evangeline district of Acadia Parish and the other a wildcat at Anse La Butte, St. Martin's Parish.

However, operators are watching particularly a wildcat near the Lockport Field of Calcasieu Parish which is reported as looking good for a producer. This test is Newton Development Co.'s No. 1 Dupre, which has been testing an oil sand encountered at 2,496-2,508 feet.

Some activity has been started in the Hackberry Dome district of Cameron Parish, La., where three additional tests are getting ready to drill. These tests are the results of the Calcasieu Oil Co.'s wildcat discovery in No. 2 Caldwell, completed early in November flowing 1,000 bbls. of pipe line oil daily.

The No. 2 Caldwell is in the East Hackberry district and it is in that district that the new tests are to be drilled. The original Hackberry operations, including approximately 60 tests, were some 3 or 4 miles west of the new drilling.

Nine shallow tests at Boling, Wharton County, are reported abandoned this week but eight of these were drilled by the Texas Gulf Sulphur Co. primarily for sulphur exploration. None of these tests encountered any showings for oil. It also will be noted in reports that eight additional tests are being started in the Boling shallow district. Most of these also are by the Texas Gulf Sulphur Co.

Austin County

The Brenham district got a small, shallow pumper during the week in Aaronson and associates' No. 4 Sundehusen. This well is making 10 bbls. of pipe line oil from a sand at 192 feet. But, in the same district, Compton & DeWare have abandoned another shallow test, the No. 1 Lehman, after drilling to a total depth of 230 feet. The latter encountered a sand at 228-30 feet with a slight showing of oil but a test failed to reveal any commercial possibilities. There is one other test in the Brenham district, this being Carlisle and associates' No. 1 Pomacal. Drilling has not started in this.

Another test in Austin County was abandoned, this being T. F. Wood's No. 1 Trenckman, 2 miles west of Peters. This test was abandoned in sandy shale at 1,061 feet.

At Raccoon Bend, Humble Oil & Refining Co.'s No. 1 Wilson encountered a sand showing some oil at 955 feet. This company's No. 2 Gotosky in the same district was drilling in soft shale at 1,349 feet Saturday. Three cores were taken in this formation but none had a showing of oil.

Brazoria County

Brazos Oil Co. has staked a location for its second Wisdom test at Damon Mound. At Allen Dome, Roxana Petroleum Co. was bailing Saturday in its No. 1 Allen Bernard. It, however, did not look like a good producer as considerable salt water and sand was being bailed along with some oil. This is a deep test with casing set at 5,335 feet. On the same dome, Roxana's No. 4 Allen at the same time was drilling a hard sandy shale around 4,600 feet. This company's No. 1 Random was drilling in sand and lime at 3,920 feet.

In its Clemens Dome test, Roxana experienced a little difficulty when the 12½-inch casing collapsed at 510 feet. The test was drilling in sandy shale and lime at 4,870 feet at the time of the accident. The operators now are preparing to run a milling tool.

Humble Oil & Refining Co. is preparing to deepen and work over its No. 4 Coon in Brazoria County. Efforts now are being made to fish out the 4½-inch liner.

Chambers County

Rucker and associates have abandoned their No. 1 Lawrence, stopping drilling at 700 feet in gumbo. Gulf Production Co.'s No. 2 Smith, High Island, is drilling below 3,430 feet. In the latter district, McLean Oil Co. has a test drilling below 3,700 feet. This is the No. 10 Cade. No. 11 on the same lease is sidetracking at 3,200 feet, and No. 6-C is drilling around 2,500 feet.

At Barbers Hill, Humble Oil & Refining Co.'s No. 5 Meyers was drilling Saturday at 2,022 feet in gumbo formation. Humphreys Corp.'s No. 6-A Kirby is drilling below 2,300 feet, and the latter company's No. 2-B Kirby still is working over.

Pure Oil Co.'s No. 1 Lost River, Lost Lake district, is drilling in sandy lime at 1,516 feet. This is a deep dome test and the only active test in this district at this time. Pure Oil Co. has locations for four other tests there but they are not to be drilled in the immediate future. Probably the next active test will be the No. 1 Lost Lake.

Colorado County

B. A. Johnson staked a location the past week for No. 1 Breeding. The only other test in this county is Merritt Drilling Co.'s No. 1 Svreck, 1½ miles southeast of Ellinger, which has been shut down for some time at 469 feet.

Fort Bend County

Fort Bend County got three producers during the week, two of which were at Blue Ridge and one at Big Creek. Gordon, Folwell & Dickson's No. 2 Blakely, Blue Ridge, is flowing 800 bbls. from a sand at 2,740 feet, and Navarro Oil Co.'s No. 1-B Robinson, a workover, is making about 250 bbls. of oil and a similar amount of salt water from 4,040 feet. At Big Creek, Gulf Production Co.'s No. 43 Davis is flowing 250 bbls. and a showing of salt water. The well is at a total depth of 3,675 feet with sand from 3,648-73 feet. The oil tests 22.8 gravity. Sam Watts' No. 1 Blakely at Blue Ridge has been abandoned. Also in the latter district, J. S. Abercrombie & Co. has what seems to be an oil sand around 3,650 feet in No. 2 West Schenck and will put the well on the pump. This operator's No. 4 West Schenck is drilling below 3,840 feet. Tom Blakely and associates' No. 1 Blakely is down around 3,625 feet. H. R. Cullen and associates are drilling in gumbo at 2,897 feet in their No. 1 Blakely. Cunningham Production Co. is deepening No. 3 Blakely after testing dry around 3,000 feet. This company also is deepening another well, its No. 1 Blakely. Gordon, Folwell & Dickson's No. 1-A Blakely is drilling below 1,900 feet. This test formerly was known as No. 1 Sharp. Gulf Production Co.'s No. 13 West Schenck is drilling below 1,750 feet, and No. 10 Luscher below 4,125 feet.

Humble Oil & Refining Co. has a location staked for a test in the DeWalt district. This will be the No. 1 on the Sugar Land Industries, Inc., property.

At Nash Dome, Ryeade Oil Corp. is drilling below 3,080 feet in No. 18 Wisdom and below 1,800 feet in No. 19. Drilling has not been started in Nos. 20 and 21.

The Texas Company has a new location in the Big Creek district, this being for its No. 3 Wheat.

Hardin County

The Texas Company has abandoned its No. 1 Sterling at Batson after drilling to 4,275 feet. In the same district, Adabel Oil Co. has a location for No. 117 McGoldrick State land. The latter company has another test at Batson, the No. 115 Honeymoon, which has been shut down for some time. S. F. Buchanan's No. 95 Millhome at Batson is drilling below 1,650 feet. Deutser Oil Co. also has started drilling No. 1 Colorado-Batson Syndicate and is down below 725 feet. Capitol Oil Co. is drilling around 4,025 feet in No. 9 Hodges. East Batson Oil Co.'s No. 7 Bates is down 1,160 feet.

At Saratoga, Gulf Production Co. has set strainer preparatory to testing No. 17 Tabor. The well is in a sand around 1,700 feet. Regna Oil Co.'s No. 2 Teel, is drilling around 1,160 feet. Two old wells, one drilled by the Sun Oil Co. and the other by Rio Bravo Oil Co., have started to drill deeper. Sun's well, No. 137 M. & M., is down around 2,100 feet and Rio Bravo's No. 104-D at 1,800 feet. Weldon Oil Co.'s No. 17 Hooks, a shallow test, has been put on the pump but is making only 4 bbls. This production is from a sand around 425 feet.

Orange Petroleum Co.'s No. 4 Merchant, Sour Lake, is drilling around 4,000 feet.

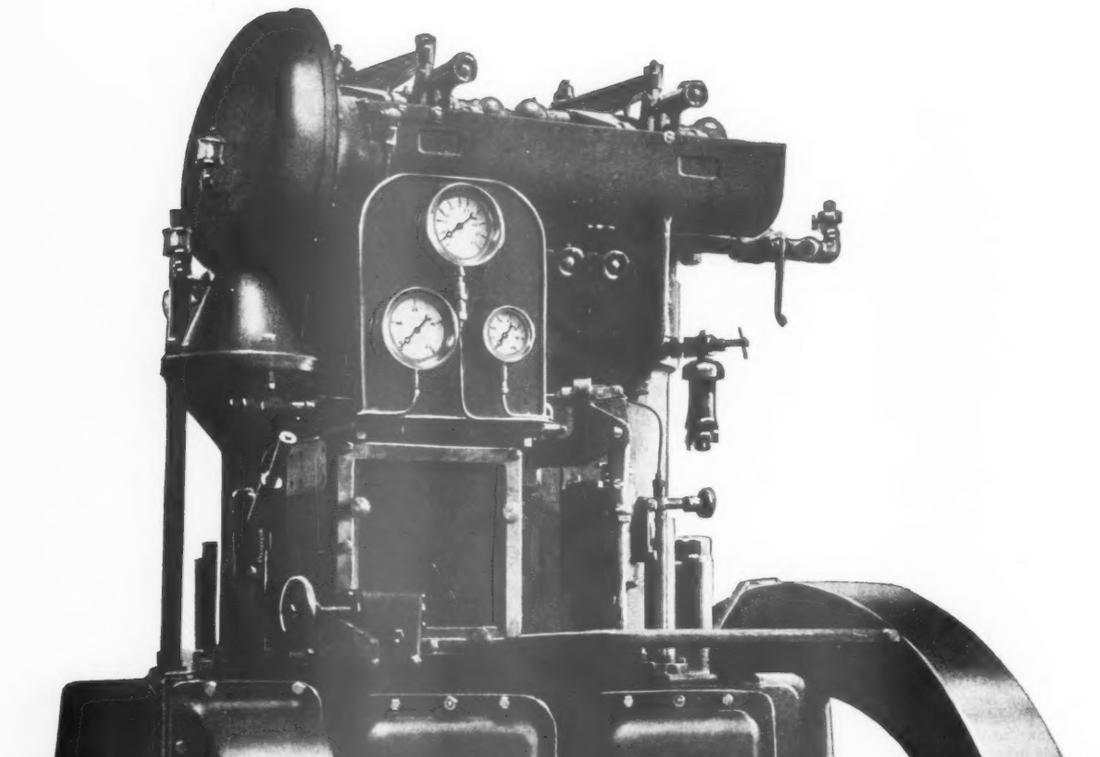
Harris County

Two small pumpers in the Goose Creek district were Harris County's only completions of the week. Both were drilled by the Gulf Production Co., No. 14 Hoffman Gaillard making 15 bbls. from sand at 2,800 feet and No. 21-A Wright, a similar amount from 2,885 feet. Both are old wells deepened. Gulf also has started to deepen its No. 18 Hoffman Gaillard.

In the same district, Humble Oil & Refining Co.'s No. 73 Simms-Smith was drilling in gumbo at 2,363 feet Saturday. Preparations are being made to wash the hole at No. 4 Ashbel Smith. This is an old well to be deepened from 2,398 feet. Humble is pulling 4¼-inch liner preparatory to deepening No. 10 Sweet. This well formerly was completed at 2,626 feet. Port City Oil Co.'s No. 1 Grace Addey at Goose Creek is sidetracking at 1,604 feet. A Goose Creek test due for an early test is Howell Oil Co.'s No. 6 Bryan, in which strainer is being set at 2,750 feet. Southern Exploration Co. is washing out in No. 6 Freeman-State. Strainer was set in this test but sanded up. The well is in a sand at 3,390 feet.

At Pierce Junction, Anderson & Plummer are rigging up for a test at No. 2 Whitehead. Joe Bashara's No. 2 Higgins is drilling around 3,510 feet. H. R. Cullen and associates' No. 4 Howe is down 90 feet where 12½-inch surface casing has been cemented. The test is waiting on cement to set. Gulf Production Co.'s No. 1 Perry is drilling around 4,950 feet. No. 22 on the same lease is down 3,625 feet. Gulf has staked a location for its No. 23 Taylor. Hute Oil Co.'s No. 1 Traper is drilling around 1,542 feet. Leonard Petroleum Co.'s No. 1 Marland

(Continued on Page 129)



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More Deep Sand Drilling in Long Beach

Expected There Will Be 200 Strings in Operation Before the Close of the Current Year

By L. P. Stockman
Staff Correspondent, California Fields

LOS ANGELES, Calif., Dec. 3,—Completions in the Long Beach Field are getting a little more numerous, and within another 60 days new wells will become quite frequent with a consequent substantial boost in total field production. A check made a few days ago shows that there are 102 new wells and 61 former upper zone producers headed down to the deep zone at the present time. The list is growing larger each week and unless something unforeseen develops over 200 strings will be in operation before the close of the current year. The outstanding completion during the past week was the California Eastern's No. 1 Masser, which came in flowing a little less than 4,000 bbls. of 29.6 gravity oil and 2,750,000 feet of wet gas daily. The importance of this completion lies in the fact that it is the deepest well finished in the Long Beach Field up to the present time. There has been a marked tendency during the past several weeks to take in as much of the producing formation as possible, and with this end in view operators are now talking of 6,000 feet instead of 5,800 feet as heretofore. E. B. Campbell finished the first well below 6,000 feet when he brought in his No. 1 Long Beach doing 4,000 bbls. a day from 6,010 feet a few weeks ago. H. B. Macmillan went Campbell a little better and finished a 3,076-bbl. well from 6,076 feet. The Superior, as noted below, carried No. 2 Swaffield to 6,150 feet. These three wells indicate the tendency toward maximum deep drilling, and the California Eastern has climaxed the situation by carrying No. 1 Masser down to the 6,435-foot level.

The Superior's No. 2 Swaffield, in contrast to the California Eastern's big well, was a distinct disappointment when given a test several days ago because of the rather insignificant production secured. Instead of coming in big, it only registered a maximum initial of 475 bbls. daily from 6,150 feet, the hole having been plugged back from 6,167 feet, at which depth a gray sand put in an appearance. The location of this well, a former upper zone producer located near the crest of Signal Hill on the west slope, indicated a probable initial of at least 2,000 bbls. daily and its failure to perform according to schedule was extremely disappointing, to say the least. No logical reason has been advanced for the small production secured except that possibly the perforations have been mudded up as a result of the heavy mud used previous to completion. The well will probably be allowed to remain on production for the present but will be killed as soon as it shows any evidence of declining as field men feel certain that production can be greatly stimulated by washing out the hole or reperforating. In the meantime, the Superior will center its activities on the other five wells being carried down to the lower sand.

Another disappointing completion listed during the week was the Shell's No. 8 Cresson which only showed an initial of about 450 bbls. after being redrilled and deepened to 5,901 feet. The small production in this instance is probably also due to the use of hematite which was used to keep the well under control previous to completion. The location of this well indicates that a part of the productive formation has probably been mudded off as neighboring wells have registered substantial production. It will probably be several weeks before the Shell lists any further deep zone completions at Long Beach as practically all of its projects under way at the present time are new wells and have several hundred feet to go before reaching the pay. The A. T. Jergins Syndicate finished an exceptionally good producer during the early part of the week when No. 2 Jackson was turned loose from 5,811 feet, the hole having been finished with a 4½-inch oil string carrying 520 feet of shop perforated. This well, a former upper zone producer, tanked 2,950 bbls. of clean 30.8 gravity oil daily upon recompletion. It is making a little better than 1,500,000 feet of exceptionally wet gas in addition to the crude oil production. The General Petroleum's No. 1 B. & S., another recompletion listed during the week, showed an initial of 1,430 bbls. when returned to production after being deepened to the 5,432-foot level. The General Petroleum's next well in this field will probably be No. 6 Boyer Kelly, which is in the oil sand at 5,750 feet.

Seacliff

Drilling operations in the recently discovered Seacliff Field in Ventura County will be in full swing within another two weeks and it is quite possible that several producers may be finished in this district before the close of the current year. These 3,000-foot wells can be drilled from spud to completion in less than 30 days and with several holes already under way they should be in a position to make a bid for production soon, unless something unforeseen develops. The Pan American is the most aggressive operator at the present time and may possibly have another well ready for production within the next two weeks. The Chanslor-Canfield Midway Oil Co. has offset the Pan American and this company will have five strings of tools in operation within a short time. The General Petroleum has two wells under way with material on ground for a third. This company has been experiencing considerable difficulty in securing access to a tideland lease during the past week or 10 days and actual spud may be held up indefinitely. A. L. Hobson and the county of Ventura have both refused to permit the company's employes access to the tideland lease and unless some compromise is effected drilling operations will be hampered by litigation. E. J. Miley did not lose any time in getting under way following the acquisition of a favorably located lease from Hamilton & Henry. The first hole on this property has already been spudded in and with rotary equipment being rigged up in both Nos. 2 and 3 an aggressive drilling campaign will get under way immediately. The Petroleum Exploration Co., Bankline, Associated and Shell should also have a new well or two under way in the very near future.

Seal Beach

There are no new wells finished in the Seal Beach Field during the current week, although there were several former upper zone producers recompleted after being redrilled and deepened to the lower sand. The Standard accounted for one of these when No. 8 San Gabriel was passed for production. This well showed an initial of 875 bbls. daily upon being returned to production from the 4,865-foot level. The Associated recompleted No. 3 Hellman in the extreme eastern part of the field after plugging back from 4,455 feet to 4,430 feet. It showed an initial of 185 bbls. on the compressor but it is quite evident that the plug is not performing its mission as the oil is cutting approximately 50 per cent water. The Rainbow Petroleum redrilled and deepened No. 1 Gibson in the town lot area from 5,294 feet to 5,435 feet and while it came in under a natural flow it only made 210 bbls. of 26.1 gravity oil daily. M. W. MacCrate's No. 1 Alamitos, another recompletion in the town lot area after being redrilled and deepened from 5,192 feet to the lower zone, was finished as a 148-bbl. pumper from 5,442 feet, the oil testing 26.5 degrees and showing a cut of 2 per cent. The Petroleum Securities has filed abandonment notices on three more wells in the town lot area, and the eight wells charged off recently represent an aggregate of about 40,000 feet of hole from which not a barrel of oil was secured. Drilling operations at Alamitos Heights are practically at a standstill, although there is still some reconditioning work being done in the hope of stimulating production.

Huntington Beach

Two new wells were chalked up at

(Continued on Page 130)

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, Well, Location—	S-T-R	Depth	Status—
Associated, No. 1 Cypress, Potrero	34- 2-14	5,410	deepening
Smith & Carpenter, No. 1 Smith	35- 2-14	5,282	rebuild rig
Hurst Oil Corp., No. 1 Inglewood, Los Angeles Co.	28- 2-14	3,772	suspended
Mont. Park Oil Co., No. 1 Browning, Monterey Park	26- 1-12	3,160	hd. sd. drilling
Associated, No. 1 Patterson, Pico	13- 2-12	3,096	sd. sh. drilling
Circle Oil Co., No. 1 Pomeroy, Manchester	23- 3-14	4,280	suspended
Shell, No. 1 Mission, San Fernando	4- 2-15	4,670	hd. sd. drilling
Sou. Calif. Drlg. Co., No. 1 Matteson, El Segundo	1- 3-13	4,870	suspended
Carr, O. K. No. 2 Foster, San Juan Capistrano	13- 8- 8	4,230	suspended
Thomason & McCoy, No. 1 Rinz, Saugus	27- 5-16	1,610	suspended
Andrews, Otis, No. 1 Lancaster, Los Angeles Co.	15- 7-12	mtl.	building
Southwest Pet., No. 1 Ramsauer, Watts	4- 3-13	4,302	sd. sh. drilling
San Clemente Oil Co., No. 1 Peck, Hawthorne	20- 3-14	5,536	to test
Horowitz, R. R., No. 1 Hawthorne, Los Angeles Co.	19- 3-14	.....	location
O'Donnell, J. E., No. 1 Dupree, Hawthorne	29- 3-14	5,304	suspended
White Behr, No. 1 Watson, L. A. County	21- 4-14	2,701	hd. sd. drilling
Shell, No. 1 Allec, Placentia	31- 3- 9	5,115	hd. sd. drilling
Standard, No. 1 Olive, Orange Co.	17- 4- 9	5,020	to abandon
Son, C. A., No. 1 Pinkerton, Orange Co.	5- 5-11	3,610	sd. sh. drilling
Ohio Oil Co., No. 1 Bolsa Dome, Orange Co.	35- 5-11	4,361	hd. sh. drilling
Stein, Leo, No. 1 Long, Orange Co.	21- 5-11	5,083	hd. sd. drilling
Shell, No. 1 Stern, Orange Co.	22- 3-10	2,360	hd. sd. drilling
Hemet Pet. Co., No. 1 Ward, Riverside Co.	9- 5- 1	1,662	hd. sd. drilling
Fuller & Gray, No. 1 Puente, L. A. County	14- 2-10	rig	rigging up
Anchor Oil Co., No. 1 Hudson, Los Angeles Co.	19- 2-10	2,395	suspended
Pet. Securities, No. 1 Newport, Orange	3- 6-10	3,928	hd. sd. drilling
Davenport O. & G. Co., No. 1 Escondido, S. Diego Co.	25-12- 2	295	sd. drilling

IMPORTANT NORTHERN CALIFORNIA WILDCATS

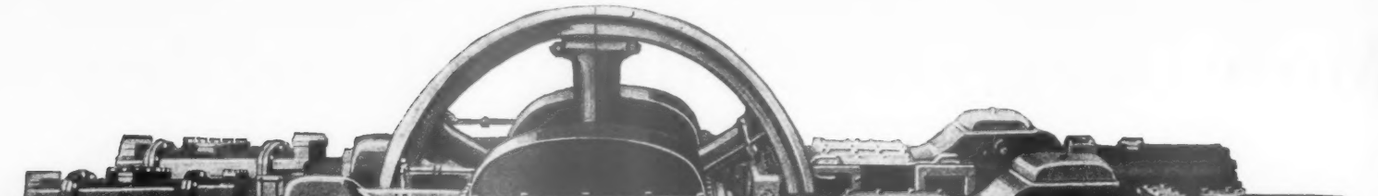
Bolsa Chica, Well No. 1 Kettleman Hills	30-23-19	3,502	suspended
General Pet., No. 2 Oschener, Kettleman Hills	26-22-18	5,299	set casing
South Coalinga, Well No. 1 Kettleman Hills	35-24-19	2,930	pipe trouble
Monocline Dev. Co., Well No. 1 Kettleman Hills	7-21-21	4,040	sd. sh. drilling
McPhail, Hugh, Well No. 1 Kettleman Hills	13-24-18	2,095	suspended
Milham Explt'n., No. 1 Kettleman, Kings Co.	2-22-17	5,698	br. sh. drilling
Shell, No. 2 Berlywood, Moorpark	32- 3-20	6,084	hd. sd. drilling
Star Petroleum, No. 2 Canet, Ventura Co.	13- 3-23	3,075	hd. sd. drilling
Continen.al Oil Co., No. 1 Burnham, Ventura Co.	22- 5-18	3,400	hd. sd. drilling
Standard, No. 1 Camarillo, Ventura Co.	29- 2-20	5,699	hd. sd. drilling
Standard, No. 1 Satiscoy, Ventura Co.	9- 3-22	rig	rigging up
Petroleum Sec., No. 1 Diablo, Ventura Co.	26- 5-18	3,470	gr. sd. drilling
Parkford, E. A., No. 1 Strathern, Ventura Co.	5- 2-18	4,002	to test
Shell, No. 1 Strathern, Ventura Co.	6- 2-18	1,004	hd. sd. drilling
Miley Oil Co., No. 1 Red Mountain, Ventura Co.	7- 3-23	980	suspended
Richfield, No. 37 Piru, Ventura Co.	35- 5-18	1,902	suspended
Superior Oil Co., No. 1 Fillmore, Ventura Co.	33- 4-20	rig	rigging up
Milham Expl.n., No. 2 Buttonwillow, Kern Co.	8-28-23	4,662	gas well
Milham Explt'n., No. 2 Kern, Kern Co.	8-28-23	.....	location
Milham Explt'n., No. 3 Buttonwillow, Kern Co.	7-29-24	4,150	suspended
Morris, F. L., No. 1 Semitropic, Kern Co.	16-27-23	.....	location
Pacific Eastern, No. 1 Fruitvale, Kern Co.	21-29-27	3,360	gr. sd. drilling
Pacific Eastern, No. 1 Bakersfield, Kern Co.	6-30-28	4,590	deepening
O'Donnell, J. E., No. 1 Union Ave., Kern Co.	7-30-28	....	location
Barnes, L. S., No. 1 Stine, Kern Co.	11-30-27	....	lqcation
General Pet., No. 1 Edison, Kern Co.	5-30-29	4,009	looks good
Getty, George F., No. 1 Edison, Kern Co.	22-29-29	3,717	to abandon
Midway Northern, No. 1 Edison, Kern Co.	29-29-30	mtl.	building rig
Union, No. 1 Mon Bluff, Kern Co.	28-27-28	1,510	hd. sd. drilling
Shell, No. 1 Mon Bluff, Kern Co.	3-28-28	3,250	hd. sd. drilling
Superior, No. 1 McFarland, Kern Co.	11-26-27	2,415	bl. sh. drilling
North American, No. 1 Wallace, Delano	5-25-26	3,703	fishing
Fresno Madera Oil Co., No. 1 Clovis, Fresno	18-12-21	3,830	hd. sd. drilling
Barneyberg Oil Co., No. 1 Brown, San Luis Obispo	25-32-14	2,205	to test
Richfield, No. 1 Wreden, San Luis Obispo Co.	10-29-17	2,148	hd. sd. drilling
Miley Ex. Co., No. 1 Clarissa, San Luis Obispo Co.	15-29-17	710	sd. drilling
Union Oil Co., No. 1 Huasna, San Luis Obispo	34-32-15	rig	rigging up
Shell, No. 1 Cowell, San Mateo Co.	8- 6- 5	5,060	hd. sd. drilling
Shell, No. 1 Mossi, Petaluma	8- 5- 6	mtl.	building rig
Shell, No. 2 Murphy, Petaluma	8- 5- 6	1,960	hd. sd. drilling
Thomas & Hammill, Well No. 1, Alameda Co.	16- 3- 3	1,470	suspended
Buttram, F. W., No. 1 Odin, Santa Barbara Co.	20-25-27	1,580	sd. drilling
Elliott & Clarke, No. 1 Marcos, Santa Barbara Co.	3- 6-29	3,409	br. sh. drilling
Gorham, G. O., No. 1 Orcutt, Santa Barbara Co.	33-10-34	mtl.	building rig
Becker, Geo. F., No. 1 Summerland, Santa Bar. Co.	33- 4-25	3,060	water trouble
Twin State, No. 1 Modoc, Santa Barbara Co.	20- 4-27	rig	rigging up
Birch Oil Co., No. 1 Porterville, Tulare Co.	13-20-26	2,530	hd. sd. drilling
Fort Wayne Synd. No. 1 Goodcell, Madera Co.	22-10-17	2,250	fishing

TANKER SHIPMENTS FROM LOS ANGELES TO ATLANTIC AND GULF COAST PORTS

Commodity—	Total This Week	Daily Average	Total Last Week	Daily Average	This Year to Date	Same Time Last Year
Crude oil	309,367	44,195	158,430	22,633	9,244,961	10,461,684
Fuel oil	72,154	10,308	.....	.....	6,788,773	6,533,438
Diesel and gas oil	.....	.....	71,362	10,195	2,375,151	2,945,036
Gasoline	159,102	22,729	189,425	27,061	8,123,375	6,232,106
Tops	.....	.....	.....	.....	.....	374,504
Coastwise—						
Crude oil	231,544	33,078	383,998	54,857	21,611,849	21,125,186
Fuel oil	308,809	44,116	248,420	35,489	11,651,566	10,618,909
Diesel and gas oil	.....	.....	15,653	2,236	356,860	165,935
Gasoline	241,581	34,512	300,941	42,992	8,994,922	6,913,983
Kerosene	.....	.....	9,117	1,158	230,801	183,239
Tops	.....	.....	.....	.....	219,255	501,520
Exports—						
Crude oil	.....	.....	63,350	9,050	2,138,240	3,651,439
Fuel oil	479,468	68,495	374,263	53,466	25,280,295	16,632,439
Diesel and gas oil	7,550	1,079	9,575	1,368	1,264,274	532,630
Gasoline	15,125	2,161	152,841	21,834	4,601,003	4,313,687
Tops	75,099	10,728	.....	.....	302,303	141,467
Kerosene	.....	.....	58,596	8,371	1,953,467	2,646,482

TANKER SHIPMENTS, SAN FRANCISCO TO ATLANTIC AND GULF COAST PORTS

Fuel oil	.....	.....	.....	.....	.....	78,653
Diesel and gas oil	137,299	19,614	.....	.....	900,061	1,962,294
Gasoline	114,253	16,322	78,033	11,148	2,042,773	931,923
Tops	.....	.....	.....	.....	.....	73,698
Lubricants	69,177	9,882	.....	.....	439,357	407,860
Coastwise—						
Fuel oil	179,508	25,644	83,882	11,983	4,643,609	4,986,999
Diesel and gas oil	.....	.....	6,993	999	223,583	.....
Gasoline	53,323	7,618	80,479	11,497	4,617,617	4,164,193
Kerosene	.....	.....	4,618	660	213,109	301,764
Exports—						
Fuel oil	.....	.....	55,488	7,927	2,381,308	2,863,280
Gasoline	.....	.....	65,411	9,344	2,678,443	1,924,814
Kerosene	.....	.....	.....	.....	897,155	1,879,829
Lubricants	.....	.....	.....	.....	26,695	66,706



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BESSEMER OIL FIELD ENGINES – COMPRESSORS VACUUM PUMPS – ROLLER PUMPING POWERS

Important Gas Merger Believed Near

Four Companies Figure in Rumors Concerning Producing and Transporting Agencies in Northern Louisiana and Arkansas

By D. H. Bancroft
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., Dec. 5.—Persistent rumors of pending mergers between gas-producing and gas-transporting agencies operating in north Louisiana and Arkansas and of acquisition of gas rights on most of the acreage in the Richland Parish Field received more credence this week with the appearance here and at Monroe of representatives of one of the two companies figuring in the merger talk and with confirmation of the gas rights deal. Details of the latter, however, will not be forthcoming until next week as the negotiations were conducted in Pittsburgh, Pa., and local headquarters of the two companies involved have not been advised.

It is known, however, that the Gulf Refining Co. and the Palmer Corp. reached an agreement whereby the latter acquires the gas rights on the Gulf's three big blocks. These two developments—the rumored merger and the Palmer-Gulf transaction—are regarded as preliminaries to a great combination for producing, transporting and marketing gas in Texas, Louisiana, Arkansas, Tennessee and Missouri referred to in an article in The Oil and Gas Journal of November 24 in connection with announcement of the Moody-Seagraves interests plans for a gas line from Richland to St. Louis. Nothing is being given out as to later developments concerning a line to St. Louis, but it is said to be certain that only one line is to be built and not two.

Four concerns are named in rumors of pending mergers, Arkansas Natural Gas Co., Empire Gas & Fuel Co., Natural Gas & Fuel Corp. and Southwestern Gas & Electric Co. A conference in Monroe late last week of these concerns, the Palmer Corp. and the Oscar Nelson interests, with perhaps others taking part, was reported to have direct bearing on the rumored mergers and the new Memphis, St. Louis and East St. Louis pipe line project.

Gassers Dominate

Gas also dominated the week's completions record in this territory, the two outstanding completions in proven territory being gassers in Cartersville. The list was longer than for the last few weeks with 29, almost equally divided among oil producers, gassers and failures. The successful wells added 375 bbls. new production and 43,000,000 feet of gas with seven of the completions in wildcat territory. Only one of these seven was a commercial well and it a small one.

Autrey Oil Co. completed No. 3 Snyder, Section 22-19-11, Bellevue Pool, at 424 feet, abandoning the test as a salt water hole. In the same district, R. L. Crook put No. 8 Larkin, Section 14-19-11, on the pump making 5 bbls. from 396 feet.

On the east edge of Cartersville proven territory, Bahan & Davis' No. 1 Dodson, Section 15-23-12, blew in with an estimated 4,000,000 feet of gas and 1,000 bbls. of fluid, 90 per cent salt water, from a total depth of 3,103 feet with the bottom in the sand. Several hours later it gauged 24,181,500 feet of gas with the same amount of fluid, but the oil content appeared to have increased. O'Brien Brothers completed their No. 1 Dodson in Section 22-23-12, as a 15,000,000-foot gasser, total depth 3,095 feet. In the Sligo district of Bossier Parish north of Elm Grove, Sligo Syndicate completed No. 2 Smith, Section 24-17-12, at 1,722 feet with sand from 1,706 feet.

None of the four Caddo completions was in the Pine Island deep stuff, though that area continues to increase its capacity as completions in the older higher horizons are taken off production and drilled to the new 3,900-foot pay. Falcon Drilling Co.'s No. 1 Schmidt, Section 27-20-15, in the Mooringsport district, was standardized after standing shut down for the last two months, and is pumping 70 bbls. from 2,292 feet with the bottom in 11 feet of broken sand.

The Greenwood district had one failure and one small gas well, the former being State Line Oil & Gas Co.'s No. 1 Amanda Sharp, Section 22-18-16, salt water at 925 feet, and the latter Belchic & Laskey's No. 1 P. A. Sharp, Section 10-18-16, with 3,000,000 feet of gas from 950 feet. Standard Oil Co. abandoned No. 54 Helpman, Section 16-21-16, in the Vivian district, after bailing down to top of the liner and getting only a barrel or so of oil, total depth 2,353 feet.

American Controlled Oil Co.'s No. 1 Lanier, Section 7-11-11, DeSoto Parish, was put on the beam for 40 bbls. from 2,735 feet and in the Urania Pool, Pima Oil Co.'s No. 10 Urania, Section 7-10-2e, is pumping 60 bbls. of oil, total depth 1,538 feet. Union Parish had a small gas well, Interstate Natural Gas Co. completing No. 1 Steele, Section 36-20-3e, at 2,162 feet with 3,000,000 feet open flow.

Three in Arkansas Proven Area

There were only three completions in Arkansas proven areas, two of them in Nevada County. Burnham and others put No. 1 McKinley in Section 9-14-21 on the beam, pumping 200 bbls. of fluid of which only 10 bbls. is oil, total depth 1,262 feet. J. J. O'Brien's No. 14-A Moss, Section 1-14-21, is pumping 30 bbls. of oil from 1,170 feet. These two are on opposite corners of the field, the former in the extreme southwest and the latter in the northeast. Standard Oil Co.'s No. 24 H. Murphy, Section 4-16-15, a 5,000,000-foot gasser at 2,609 feet, was Smackover's only completion. It was a second completion, having been listed June 2, 1925, as a 700-bbl. producer at 2,386 feet.

Panola and Harrison Counties, Texas, had five completions between them, one of them a small producer and one a failure. In the Waskom district of Harrison County, Simms Oil Co. completed No. 2 Z. Abney on the James Bryant Survey, making 5,000,000 feet of gas, total depth 1,965 feet, and Tylong Oil & Gas Co. completed No. 1 Vaughn, W. R. Anderson Survey, making 4,000,000 feet of gas at 970 feet. Bethany Oil & Gas Co. abandoned No. 3 Richardson, J. Yarnell Survey, on account of salt water at 1,041 feet. Magnolia Petroleum Co.'s No. 2 Sarah Davenport, Jessie Dunlap Survey, pumped 10 bbls. of oil and 5 of salt water at 2,398 feet and its No. 12 Carrie Steele on the B. C. Jordan Survey made 2,500,000 feet of gas from 984 feet.

Reductions in the price of Urania and Smackover light and heavy oils of the week before were followed this week by announcement of a 15-cent cut in Cotton Valley posted price, making that oil now 85 cents per barrel. The Louisiana Oil Refining Corp., which led the previous changes, also was the first to post the new Cotton Valley price, being followed the next day by Standard Oil Co., these two being the only pipe lines running that oil at present.

Four-Mile Pipe Line Completed

Reserve Natural Gas Co., a part of the Moody-Seagraves Houston pipe line project, completed 4 miles of 10-inch line from Cartersville to junction with its Mooringsport-Sarepta-Shongaloo line and also a 14-mile, 10-inch feeder from Sarepta to Louisiana Oil Refining Corp.'s lease in Section 14-21-10, Webster Parish, which will draw on Cotton Valley Trinity gas reserves. Magnolia Petroleum Co. and the Moody-Seagraves interests are competing for Cartersville and Webster Parish gas for their lines to Houston, which accounts for most of the continued activity in those areas. Pipe line activties under way in the Monroe district consist, in addition to the two Monroe-El Dorado-Camden projects, of construction of two additional short lines from the field to Monroe and West Monroe by the Ouachita Natural Gas Co., at a cost of approximately $100,000, which will deliver an additional 14,000,000 feet of gas, the existing line having a capacity of 18,000,000 feet per day. Also, Jordan Drilling Co. and the Hodge Lumber Co. interests of Hodge, La., are building a 43-mile, 6-inch line to Hodge to supply fuel to the plant of the Advance Bag & Paper Co., under construction at Hodge.

Production in north Louisiana and Arkansas declined, total daily average pipe line runs being 144,680 bbls., compared with 145,950 the week before. Louisiana runs were 48,010 bbls., a decline of 1,130, and Arkansas' average was 96,670, a decline of 140 bbls. Caddo light, DeSoto-Red River, Pleasant Hill and Nevada County districts show the largest differences, Caddo light running 450 bbls. less than last week, DeSoto-Red River 230, Pleasant Hill 265 and Nevada County 230 bbls. under their last week's shipments. Smackover heavy oil runs were 100 bbls. per day more than last week.

Daily average runs from the field for the several pools this were the following:

	Dec. 3
Caddo light	11,960
Caddo heavy	4,050
Homer	4,640
Haynesville	6,920
DeSoto-Red River	4,160
Elm Grove	620
Bellevue	1,060
Cotton Valley	5,040
Urania	9,015
Pleasant Hill	605
Total Louisiana	48,010
El Dorado	6,100
Smackover light	9,425
Smackover heavy	73,670
Stephens	1,200
Nevada County	3,450
Lisbon	2,700
Bradley	125
Total Arkansas	96,670
Both states	144,680

NORTH LOUISIANA

Bossier Parish

Bellevue District—R. L. Crook put No. 8 Larkin, Section 14-19-11, on the pump and immediately made location for No. 9 on the same lease, 1,170 feet south and east NW cor. SE, Section 14-19-11. Humble Oil & Refining Co.'s No. 30 Bliss & Wetherbee, Section 15-19-11, is drilling hard sand at 4,612 feet.

Cartersville—Arkansas Natural Gas Co. began drilling No. 1 Barnette, Section 17-23-12, November 29, and is down 150 feet. Belchic & Laskey began drilling No. 1 Dodson, Section 22-23-12, November 23, set 12½-inch surface string at 301 feet, and have cemented 8-inch casing at 800 feet. Magnolia Petroleum Co.'s No. 1 D. W. Roberson, Section 26-23-12, is drilling shale at 2,612 feet. Woodley & Collins have cemented 6-inch

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PROMISE OF ANOTHER GAS FIELD IN NORTHERN LOUISIANA IS SEEN

By D. H. Bancroft

SHREVEPORT, La., Dec. 5.—With the Palmer Corp.'s No. 1 White in Section 2-19-10, West Carroll Parish, showing for gas in commercial quantities from 16 feet of pay at 2,450-66 feet, prospects for another new gas field in north Louisiana, the third in this territory this year, are seen. The wildcat is approximately 30 miles east of production in the Morehouse Parish end of Monroe Field and 35 miles northeast of production in the Richland Parish Field. A test probably will be made this week, 6-inch casing having been run late last week.

Meanwhile Moody & Seagraves' No. 2 McCoy, in Section 30-16-6, Richland Parish, is attracting attention. While drilling in after setting 6-inch casing at 2,303 feet, it blew out with an estimated 12,000,000 feet of gas at 2,406 feet. It was brought under control with the intention of setting liner and late Friday was reported to the offices of the Department of Conservation here as gauging 75,000,000 feet of gas from around 2,450 feet, the largest gas well yet completed in the Richland Parish Field and one of the largest ever completed in the state.

These two developments headed the list of a rather exciting week of wildcat activities in this territory. The week began with a great scurrying in the Champagnolle district of Union County, Arkansas, as a result of Eddie Jones' completion of No. 1 Crain, in Section 2-14-17, as an extension of proven territory, making an estimated initial production of 2,000 bbls. daily. The completion is reported to have wrecked a gentlemen's agreement between Ohio and Magnolia Petroleum Co. to restrict operations to such wells as might be necessary to prove or hold their leases, as Jones immediately made locations for three more wells on the same "40," necessitating locations for nine offsets by the Ohio, contracts for six of which wells have been awarded.

Well Looks Better

Magnolia Petroleum Co. ran tubing in No. 1 Carroll, Section 1-17-14, and the well is now flowing about 200 bbls. No. 2 in the same lease is still shut down waiting orders at 1,500 feet. Garrett-Modisette Drilling Co. and Keen & Woolf swabbed No. 1 Gregory, Section 10-17-14, 2 miles southwest of production, and turned it into the tanks, flowing at the rate of 528 bbls. fluid, 12 per cent water, per day from 4 feet of sand at 2,761-65 feet, apparently better than was anticipated following a test early last week, which led to tubing being set with packer.

In Nevada County, McDonald and others made another test on No. 1 Pelt, Section 9-15-22, 11 miles southwest of production, getting salt water with a small amount of oil at around 2,095 feet, the same results having been obtained in a prior test of 5 feet of sand at 2,027-35 feet.

H. S. Goodwin and others' drilling No. 1 Curtis in Section 2-16-13, Bossier Parish, about 8 miles south of Shreveport and twice that distance northwest of Elm Grove production, had a blowout of 5,000,000 feet of gas and 5,000 bbls. salt water at 2,604 feet, which attracted attention because it was the first show of anything besides dust or salt water that has been developed by any of the several wildcats in that vicinity drilled in the past several years. It is believed to prove an extension of the pay found in wells

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Cole Field Extended by Good Gasser

Houston Oil Co. Brings in Well With Initial Production of 32,000,000 Feet on Sun Oil Lease, Webb County, Texas

By B. D. Stevenson
Staff Correspondent, Southwest Texas

SAN ANTONIO, Tex., Dec. 5.—Houston Oil Co. brought in a 32,000,000-foot gas well in its No. C-2 Benavides on a Sun Oil Co. lease in the Myrtle E. Hale subdivision of the Mariano Arispe grant in Webb County last week at a depth of 1,537 feet and squeezed the Cole gas field out a little farther to the south and west. The well is a half mile south of the last well by the Associated Oil Co., which extended the field a mile to the west. This field is now around 8 miles long north and south and about 2 miles or more wide, all producing at around 1,537 to 1,800 feet.

The Houston company's well was the only producer completed in the Laredo territory in the last week. Several more or less interesting and important features in the field are in a state of incompletion. Johnson and others, who have been doing no drilling for months in the Randado Field, where they have some production, are starting drilling again. Alworth has made a new location in the Alworth Pool 5 miles south of Randado. Both have made locations in Jim Hogg County.

Of some 32 operations listed in the Mirando district 19 are active. In addition six new locations were announced in the last week and five tests were abandoned. There is probably less drilling in the Mirando territory than at any previous time in the history of the field which has seen 200 operations under full swing.

Outside of the Mirando district the activity in proven fields in Southwest Texas is confined mainly to the White Point district in San Patricio County and the Refugio Field in Refugio County. One well was completed the past month in the Luling Field by the Magnolia. It was a 20-bbl. well and the only well drilled in the field for the month. Magnolia is drilling another now and Pat Armstrong is starting one. In the Dale Field, northeast of Luling, The Texas Company is the only company drilling. It is starting three wells forced by the fact that they are offsets and probably must be drilled to protect the leases since the wells they offset are not large.

In Somerset Schimmel is the only operator drilling and in the Adams gas field in Medina three rigs running. Houston Oil is operating a rig in the Cartwright gas field in Live Oak County. This is all the proven activity.

In Southwest Texas generally, though, there are about 200 wildcatters at work. Eleven wells completed in Somerset by Schimmel and reported this week cover completions of the past three months. Other than these there were three oil wills completed in the Dale Field and some gassers in the Refugio and White Point Fields, none of which was out of the ordinary.

O. W. Killam last week abandoned his No. 8 Benavides in Lot 6 of Section 11 of the Cole gas field at 3,965 feet. The field is producing at around 1,700 to 1,800 feet in that part of the field. Killam made a deep test thinking to pick up some oil production and anyway some deeper gas production. He tested a little gas through a drill stem tester at 2,570 feet and some oil and salt water at 3,965 feet, at which depth he twisted off five joints of drill stem and so decided to abandon the well. Killam after a summer of inactivity recently returned to the field determined to put down some deeper tests in particular localities over the Mirando district. His program includes a continuation of deep drilling all through the winter.

Caldwell County

The Texas Company's No. 7 Clingensmith, Squire Damon Survey, Dale Field, at 2,132 feet made 34 bbls. the first 24 hours; No. 4 Clingensmith, same field and survey, at 2,341 feet is a 40-bbl. well; No. 4 Lackey, same field, Nich Kelly Survey, at 2,275 feet is a 27-bbl. well; No. 3 Beatty, location in the same field, has been abandoned and location has also been abandoned in the field for the No. 2 Lackey.

Duval County

Houston Oil Co.'s No. 1 2-"C" 2 Benavides, corner Blocks 7, 8, 61 and 62 in the Cole Field at 1,537 feet gauged 32,000,000 feet of gas. O. W. Killam's No. 8 Benavides in Survey 11, Block 5, in the Cole Field, has been abandoned at 3,965 feet. Cole Petroleum Co.'s No. 50-A Benavides, Survey 5, Block 7, in the Cole Field, lost hole at 138 feet and was abandoned.

Gonzales County

H. B. West, trustee's, No. 2 Preston, W. W. Pace League, R. P. Whitney Survey, has been abandoned at 1,700 feet.

Jim Hogg County

Houston Gulf Gas Co.'s No. 14 Palacious, Survey 291, Block 12, in the Randado Field, has been abandoned dry at 1,262 feet.

Live Oak County

Houston Oil Co.'s No. 20 Cartwright, M. Trudo Survey, in the Cartwright Field, at 2,160 feet gauged 35,000,000 feet with rock pressure of 925 pounds. Encino Oil Co.'s No. 1 Stewart, Ezzo McWhorter Survey, has been abandoned dry at 2,212 feet.

Bexar County

(Completions for past four months.)

Associated Petroleum Co.'s No. 4 Koehler at 1,325 feet is a 10-bbl. well; No. 7 Koehler at 1,325 feet is a 6-bbl. well; No. 8 Koehler at 1,350 feet is a 5-bbl. well; No. 9 Koehler at 1,330 feet is an 8-bbl. well. Schimmel Petroleum Co.'s No. 10 Koehler at 1,350 feet is a 7-bbl. well; No. 11 Koehler at 1,325 feet is a 9-bbl. well; No. 12 Koehler at 1,350 feet is a 6-bbl. well; No. 13 Koehler at 1,325 feet was abandoned dry; No. 14 Koehler at 1,325 feet is a 4-bbl. well; No. 15 Koehler at 1,330 feet is a 7-bbl. well. G. E. Ginter's No. 1 Gayle is a 3-bbl. well.

Goliad County

Houston Oil Co.'s No. 4 Pettus, P. Trevino Survey, has been abandoned dry at 4,154 feet.

Jackson County

Wright Brothers' No. 6 Drushell has been abandoned at 2,886 feet; No. 1 Lee has been abandoned at 2,670 feet; No. 1 Foltz has been abandoned at 2,640 feet; No. 2 Fuqua has been abandoned at 2,830 feet dry.

Nueces County

Perry and others' No. 1 Terrell at 2,331 feet gauged 1,500,000 feet with 850 pounds rock pressure.

Webb County

Houston Oil Co.'s No. 3 S. Benavides, Survey 683, Carolina-Texas gas field, at 3,014 feet has been temporarily abandoned after testing some gas and salt water. Colon Schott's No. 1 Bruni, Survey 835, Block 3, Aviator Field, at 1,667 feet, has been abandoned after testing salt water.

Refugio County

Houston Oil Co.-Pratt-Hewitt's No. 3 Rooke at 2,083-90 feet gauged 20,000,000 feet with 530 pounds rock pressure.

San Patricio County

Houston Oil Co.'s No. 1 Baldwin, Ross Survey, Block 5, White Point gas field, at 2,291-2,307 feet gauged 50,000,000 feet with 980 pounds rock pressure.

Val Verde County

Crusoe Williams' No. 1 Holman, Section 5, Block N, has been abandoned at 2,940 feet dry.

New Locations

Cole Petroleum Co.'s No. 50-B Benavides, Survey 5, Block 7, Cole Field, Duval County, is drilling at 60 feet.

Houston Oil Co.'s (Texas) No. 2 S. Benavides, corner Blocks 337, 338, 343 and 344, Cole Field, Duval County, is moving on.

Magnolia Petroleum Co.'s No. 33 Merchants State Bank, Survey 415, Randado Field, Jim Hogg County, is location.

Johnson and others' No. 21 (Palacious) is coring for sand below 1,200 feet in the Randado Field in Jim Hogg County.

Alworth-Stevens-Hild's No. 10 M. Garza, Survey 39, Block 7, is location in the Alworth Pool in Jim Hogg County.

R. Driscoll's No. 8 Driscoll (fee), Survey 23, Duval County, is drilling at 210 feet.

Krusch Exploration Co.'s No. 1 Frank Doyno and others, Block 13, Porcion 75, Starr County, is drilling.

Schimmel Production Corp.'s No. 16 Keohler, Survey 39, Somerset Field, Bexar County, is location 574 feet to east and 852 feet to south line; No. 17 Koehler, same survey, is location 525 feet south of No. 15.

The Texas Company's No. 1 Moore, Jasper Gilbert Survey, Dale Field, Caldwell County, is location; No. 1 Osteen, W. C. Swearingen Survey, same field, is location; No. 2 Osteen is location in same survey and field.

Alexander-Lyles & Adams' No. 1 Ballard, William Spillar Survey, Caldwell County, has contract let for test and derrick up.

The Texas Company's No. 1 Robuck wildcat in Ben McCulloch Survey in Caldwell County, is moving in machinery and has derrick up.

Houston Oil Co.'s No. 4 Rooke is rigging up in the Refugio Field to deepen to the 3,300-foot sand.

Parkhill Oil Co.'s No. 2 Rettig, Milam County, T. J. Chamber Survey, is location 180 feet east of No. 1.

Cole Gas Field—Duval

Houston Oil Co.'s (Humble) No. 1 Juan V. Cuellar, Share 1, Cuellar grant, 3,300 feet to southwest and 2,324 feet to southeast lines, is moving on. O. W. Killam's No. 8 R. Benavides, Survey 11, Block 6, at 585 feet to northwest and 150 feet to southwest lines, is fishing at 3,965 feet. Houston Oil Co. (Sun) No. C-2 Benavides corner, Blocks 7, 8, 61, 62, is drilling at 1,200 feet. Cole Petroleum Co.'s No. 50-A Benavides, Survey 5, Block 7, located 625 feet to northeast and 650 feet to northwest lines, has spudded in.

Piedras Pintas

Humble Oil & Refining Co.'s No. 7 Walsh, Survey 185, located 2,050 feet to east line and 1,750 feet to north line, is drilling at 3,900 feet.

Randado Field—Jim Hogg

Magnolia Petroleum Co.'s No. 32 Merchants, Survey 415, located 850 feet to

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SEVEN TESTS IN SOUTHWEST TEXAS DRILLING BELOW ONE MILE EACH

By B. D. Stevenson

SAN ANTONIO, Tex., Dec. 5.—Seven wells drilling in Southwest Texas at this time are all more than a mile deep and two of then are about 1½ miles deep each. Two others are below 4,000 feet and in addition Magnolia recently abandoned a well in Fayette County at 4,200 feet. There are more mile-deep wells drilling in Southwest Texas than ever were drilled in that territory all told prior to 1927.

A few years ago when wildcatting was starting in Southwest Texas it was a rule of thumb that there was no use drilling below the top of the Austin chalk, which is a comparatively shallow formation in and around San Antonio. There is almost no production at this time in Southwest Texas below 2,250 feet. About a year ago the agitation started and conviction followed that deep drilling would pay off in Southwest Texas and the conviction seems to be growing with the industry.

United North & South has two wells in the Luling Field, one at approximately 6,850 feet and the other at approximately 7,300 feet, which have been in schist since a depth of 4,700 feet. It is barely possible they will get through the schist and yield definite information as to how thick the schist is, but the granite below the schist is likely to be 12,000 feet thick and it seems doubtful if the drillers get through that.

Other than these two wells, which are curiosities, Rycade has two wells in Maverick, Magnolia has one well in Val Verde and Cole Petroleum has one well in Webb County, each of which is more than a mile deep and each of which is drilling in formations which at least could "pay off." Humble has drilled a number of 4,000-foot tests in different wildcat territories and has one down 4,066 feet now in Duval at Piedras Pintas and another at 4,387 feet in Dimmit County. The Austin is no barrier any more to anybody, and when things "pick up" again in the industry deeper drilling will be still more of a settled policy.

During the past week features in wildcat territory included a new location for Robert Driscoll on the big ranch he owns in fee in Duval County between the Piedras Pintas Field on the northeast and the Cole Field on the southwest. While drilling a water well there he ran into several million feet of gas and considerable oil at 2,469 feet. The rig was a light affair and it was impossible to complete the well though it looked as though it had enough oil to make a commercial well. It is in pure wildcat territory. Driscoll has started a new well with a good rig 400 feet north of the other test.

Cole Petroleum Co.'s No. 36 Benavides in Section 412 of Webb County 3 miles west of the Cole Field had a fishing job on hand at 5,525 feet, but has been able to catch the tools and is pulling them out with a hydraulic pulling machine. Rycade's No. 2 Sullivan in Maverick County, which had tools lost at a mile depth has sidetracked them and is drilling at 5,315 feet.

Two new wildcat tests are being started in Caldwell County between the Dale Field on the northeast and the Luling Field on the southwest, where a lot of wildcat effort has been put forth in times past. The Texas Company's No.

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Central West Has Only Average Wells

Some Important as Slight Extensions to Fields. Only a Score of Completions Reported During Week

By Whit
Staff Correspondent, Central West

FINDLAY, Ohio, Dec. 5.—Very few features are reported from any division of the Central West Field during the past several days, although some important wells of only average production were found in advance of production. A slight extension was made to the old Lima Field when a test on the M. E. Roberts, Section 14, Bath Township, Allen County, came in at 25 bbls. Another extension was made when a 26-bbl. initial producer was opened up in a test on the Dubois farm, Section 13, Washington Township, Auglaize County.

In western Indiana, in Sullivan County, No. 4 on the John A. Thomas farm, Section 6, Fairbanks Township, had an initial of 100 bbls., and a purely wildcat drilled on the Doctor Hoover farm, Section 2, Jackson Township, Spencer County, produced an initial of 12 bbls. from a depth of 1,220 feet.

Illinois had one test well drilled on the Emma Price farm, Section 25, Prairie Township, Crawford County, with an initial of 20 bbls., from 1,040 feet.

In the five divisions of the Central West, including Michigan, there were 20 completions for the week, 13 of which were producers with an initial production of 302 bbls., 6 dry holes and 1 gas well, while 33 old wells were pulled out and abandoned.

Lima Field

There are only slight changes in the old Lima Field of northwestern Ohio as the usual number of wells are under way on account of the fairly good weather that has prevailed for some time, but when the severe winter season sets in work will slacken down to a minimum, as has been the case during the past years since the close of the war.

No new completions were reported from the Wood County Field, and few new wells starting. In Montgomery Township, the Sun Savings Bank Co. pulled out and abandoned Nos. 14 and 16 on the Sarah Inman farm, Section 14. The Ohio Oil Co. did the same with old No. 1 on the A. F. Basey farm, Section 15, and D. Amos and others abandoned No. 3 on the Westerfield-Wirebaugh farm, Section 2. In Portage Township, A. T. Carpenter pulled out No. 6 on the M. Klotz farm, Section 26, and No. 4 on the Mary D. Smith farm, Section 12. In Freedom Township, the Ohio Oil Co. abandoned Nos. 2, 5 and 8 on the Seymore W. Owens farm, Section 34. In Troy Township, the same company pulled out Nos. 1, 2, 3, 4, 5, 6 and 7 Henry Overmeyer farm, Section 24. In this township, Lewis Hille is drilling No. 3 on his own farm, Section 13.

In the Findlay Field of Hancock County, Pleasants Township, the Bath Township Oil Co. is drilling No. 8 on the John A. Bryan farm, Section 14. In Eagle Township, B. Porter and others are working at No. 22 on the Henry Deeds farm, Section 6.

In Allen County, Bath Township, northeast of Lima, W. W. Bolz and others' test on the M. E. Roberts farm, Section 14, pumped an initial of 25 bbls. Same party is drilling a test on the N. E. Leedy farm, Section 12. George A. Helmkamp, agent, is drilling No. 1 C. G. Vore farm, same section. Carman Oil Co. is drilling a test on the M. J. Powell farm, Section 13. In American Township, the Ohio Oil Co. abandoned No. 3 B. Miller farm, Section 16, and in Perry Township, this company pulled out No. 12 Ben C. Faurot, No. A lease, and No. 2 on the John Martin farm, both in Section 29.

In Auglaize County, Washington Township, W. E. Cook and others' test in the southeast corner of the W. V. Dubois farm, in the northeast quarter of Section 13, pumped an initial of 26 bbls. Sand was topped at 1,188 feet and drilled 100 feet in the sand. The Real Oil Co. is drilling a second test on the Ben Wierwell farm, Section 29. In Logan Township, John Fox and others are drilling a test on the John Howisher farm, Section 27. In Noble Township, the Petroleum Producing Co. is drilling No. 3 Joseph Mallory farm, Section 9, and in Salem Township, Stelzer & Boyd are drilling No. 5 O. F. Benton farm, Section 6. In St. Marys Township, the Ohio Oil Co. abandoned old No. 1 on the Sam Sweigert farm, Section 5, and one of the oldest producing wells in the St. Marys Field, close to the St. Marys reservoir.

Sandusky County

In Sandusky County, Woodville Township, Gustave Magsig's No. 29 well, 750 feet from the north line and 75 feet from the east line of the Gust Magsig farm, in the northwest quarter of Section 26, struck top of sand at 1,253 feet and at 45 feet in the sand got a 12-bbl. initial pumper. The Ohio Oil Co. abandoned No. 4 Jacob Rolf farm, Section 7, and No. 1 George Walter farm, Section 8. In Washington Township, the Lindy Oil Co. is drilling No. 2 John E. Boyer farm, Section 11.

In Mercer County, Hopewell Township, A. J. Metzger is drilling No. 4 on the Samuel Teeters farm, Section 20. In Van Wert County, Jennings Township, J. H. Reynolds and others are working at No. 6 on the Phil Louth farm, Section 5.

In the Tiffin Field of Seneca County, Geyer & Shaul have a rig in for a second test on the Charles Shaul property, Section 18, Clinton Township. In Liberty Township, the Wiser Oil Co. is starting a test on the Andrew Kimmel farm and J. H. Murphy & Son are starting No. 3 Dave Hunker farm, Section 21. In Jackson Township, J. W. Fox abandoned Nos. 11 and 12 Ida A. and W. J. Peeler farm, Section 11.

In Ottawa County, Catawba Township, the Catawba Oil & Gas Co. is drilling a test on the J. P. Cagney property on Catawba Island. In the Elmore Field, Harris Township, T. F. Lewis and others abandoned Nos. 2 and 3 Magge-Magee farm, Section 19, and Gust Magsig & Son are drilling No. 15 on the Charles H. Magsig farm, Section 23.

In McDonel Township, Hardin County, H. E. Schmidt's No. 9 on the Earl Hites farm, pumped 5 bbls. initial. Roundhead Oil & Gas Co. is drilling No. 5 Mary J. Austine No. 2 farm, and the Hardin Oil & Gas Co. is drilling No. 10 on the A. R. Zimmerman farm.

In Cynthian Township, Shelby County, the Eilerman Oil Co. is drilling No. 4 on the N. A. Paulis farm, Section 35.

In Mississinewa Township, Darke County, the Cole Oil & Gas Co. abandoned Nos. 3 and 4 on the W. C. Discher farm, Section 11.

Reports are that some leasing is being done north of Bucyrus, near the town of Chatfield, in Crawford County, where a structure is said to exist. This is southeast of the Tiffin Field, and if there is a field there it may be in two different formations. One is the Clinton lime and the other is the Trenton.

Indiana

The best of Indiana's late completions was found in the northern part of Sullivan County, near the Vigo County line and in Fairbanks Township. The well is the Siosi Oil Corp.'s No. 4 on the John A. Thomas farm, Section 6, and south of where the same company has found some nice producers on the Riggs farm, to the north across the line into Prairie Creek Township, Vigo County. In Fairbanks Township, on the Sullivan County side, this company is drilling Nos. 5 and 6 on the Thomas farm. Bays and others are putting down a test on the J. T. Mayfield farm, Section 5, and Hill and others are drilling a test on the J. H. Harris farm, Section 35, while Baldridge, Whittacre and others are working at a test on the Charles Scott farm, and the Twin Creek Oil Co. is drilling a test on the Nora Williams farm, Section 9.

In Prairie Creek Township, Vigo County, the Siosi Oil Corp. is drilling Nos. 5, 6, 7, 8, 9 and 10 on the William farm, Section 31. The Ohio Oil Co. is drilling No. 1 on the W. F. Collins farm, same section.

A very important wildcat well has been completed in the extreme southern part of the state, north of Owensboro, Ky., in Jackson Township, Spencer County, by D. D. Flanagan on the Doctor Hoover farm. This well has been under way for a long time but has at last been drilled in to a depth of 1,220 feet and its first 24 hours' production amounted to 12 bbls. Some are of the opinion that it will mean an extension to the north of the productive Ohio County, Kentucky, Field, being almost due north, and leasers are taking advantage by securing acreage in case it does prove a productive area. A well is also

(Continued on Page 77)

DISCOVERY IN DAVIESS COUNTY, KY., PROMISES SPURT IN DEVELOPMENT

By Whit
Staff Correspondent, Kentucky-Tennessee

BOWLING GREEN, Ky., Dec. 5.—The most active area of the Kentucky Field continues to be centered in Ohio, Daviess and McLean Counties, although the latter county is not getting the play it should with a well showing like that of the Dimmick Brothers, on the Ratliff farm, which was credited with an output of 110 bbls. initial and has all available tankage full of crude and not as yet reached by a pipe line extension which according to advice is under way, and will be rushed through as rapidly as possible.

The good showing reported in the Hayden farm well which is to the north about 2½ miles from the McLean County line and in the southern part of Daviess County, has caused a flurry and the next few weeks should show a lot of development. The actual value of this well is yet uncertain, although it is said to make an excellent showing, to such an extent that increased prices are being paid for leases and royalty interests. The well on the W. G. Hayden 168 acres was drilled by L. C. Young and others to a depth of 1,050 feet, and caused all the late rush to that part of Daviess County. It is now the belief that pools will be found in the deeper sand areas in the western portion of Ohio County and to the west in Daviess and McLean Counties, larger than those found in the Ohio County Field at around 700 feet, but if pools more productive than the Ambrose Pool are found, the western division of Kentucky will soon rival the eastern division in amount of production. The supposition of many is that the field will extend across the Ohio River into Indiana, as a new completion in Spencer County, Indiana, found a 12-bbl. producer at 1,220 feet in what is said to be a formation similar to that on the Kentucky side of the river.

The largest producer since the last report is no doubt the well on the Bob Hamilton 350 acres, southeast of the Ambrose Pool, in Ohio County, which is reported from 200 to 250 bbls., and midway between this pool and the Sunnydale Field, making a large area look inviting only 1½ miles from the famous Weller farm, where James C. Ellis brought in 25 large producers.

Another important well is that of the Ohio Oil Co., on the Lawrence Roby lease, in Daviess County, near the hamlet of St. Lawrence and west of the Roby Pool, good for around 50 bbls. initial. This well is almost due west of Pellville.

Week's Work

A summary of the week's work in the Kentucky Field shows 32 completions, 20 producers with an initial production of 603 bbls., 11 dry holes and 1 gas well. Compared with the previous week, there were six more completions, two less producers, 61 bbls. less production, seven more dry holes and one more gas well. The wells were distributed by counties and districts as follows:

County—	Comp.	Oil Wells	Prod.	Dry	Gas
Ohio	11	6	475	5	0
Estill	8	5	16	3	0
Barren	4	4	45	0	0
Lee-Owsley	3	2	4	1	0
Daviess	1	1	50	0	0
Johnson-Magoffin	1	1	10	0	0
Wolfe	1	1	3	0	0
Floyd	1	0	0	0	1
Wayne	1	0	0	1	0
Edmondson	1	0	0	1	0
Total	32	20	603	11	1
Last week	26	22	664	4	0
Difference	6	2	61	7	1

Eastern Kentucky

A few completions are reported from the eastern division of Kentucky, well scattered, mostly small producers where oil is found.

In District 13, Wayne County, March & Hicks found a dry hole in a test on the E.G. Guffey farm.

In Lee-Owsley Counties, District 17, the Harris-Spencer D. & T. Co.'s No. 3 Dorts and Short least is reported at 2 bbls. In District 18, Cook and others' second well on the Wiley Bryant lease is also a 2-bbl. pumper. In District 20, Tipton & Tackett's No. 3 on the Sarah Vanderpool farm is a duster.

In Estill County, District 8, the Superior Oil Corp.'s Nos. 27 and 28 J. D. Alexander farm are both dry holes, and No. 21 on the Thomas Herndon farm is a 3-bbl. pumper. Brenner, Adams and others' No. 8 John Sparks, is a 3-bbl. pumper and No. 7 on the Elizabeth Stacey is a 3-bbl. pumper initial. Reno Oil Co.'s No. 6 Mitchell is good for 2 bbls., and its No. 7 on the John Goff is dry. Waco Oil Co.'s No. 16 A. J. Rawlins is a 5-bbl. pumper.

In Wolfe County, District 9, the Superior Oil Corp.'s No. 7 O. F. Asbury, is a initial 3-bbl. pumper.

In Johnson-Magoffin Counties, District 31, the Short Fork Oil Co.'s No. 6 J. W. Frazier is a 10-bbl. initial producer.

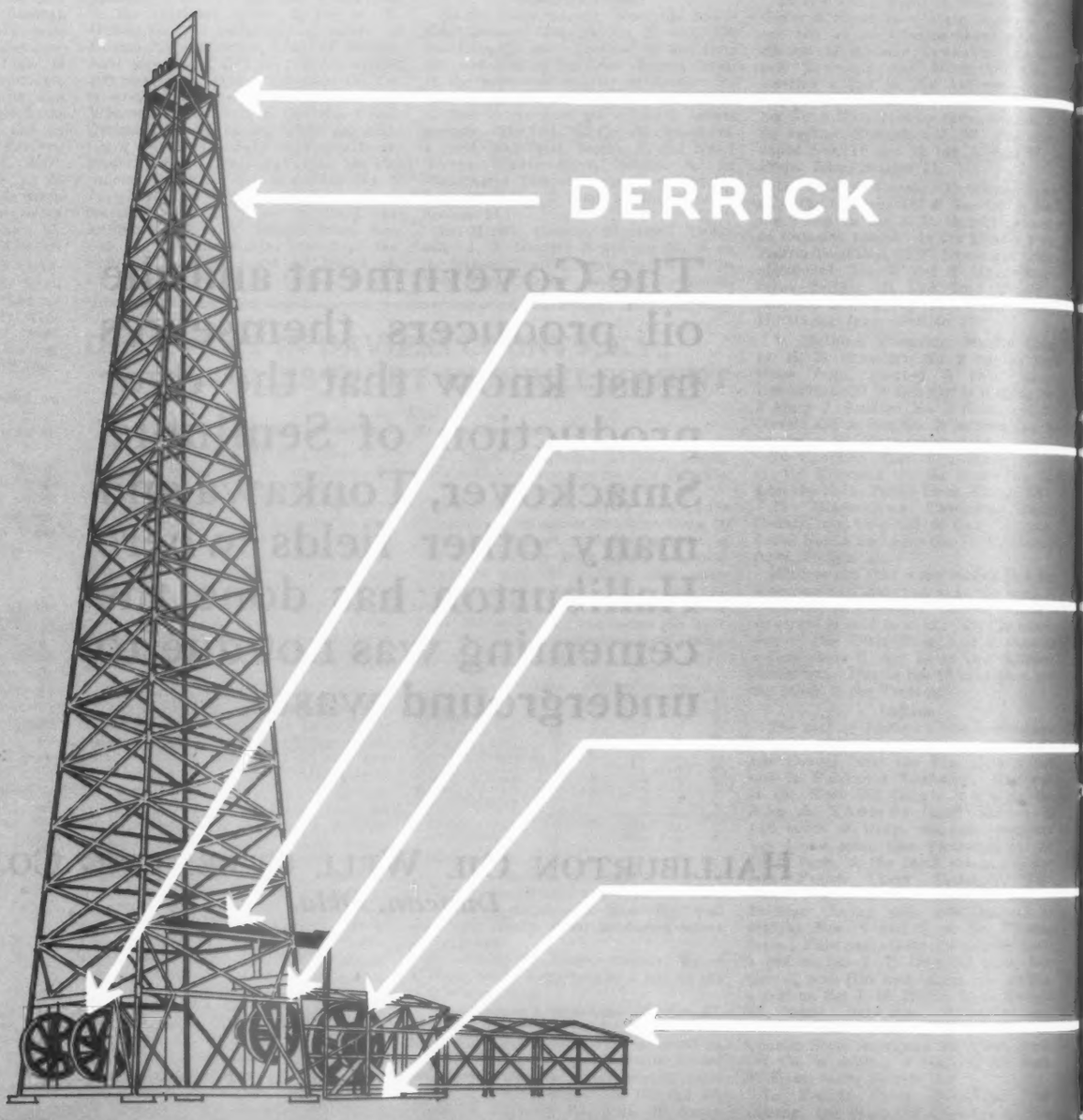
In Floyd-Knott Counties, District 21,

(Continued on Page 106)

The Government and the oil producers themselves must know that the over production of Seminole, Smackover, Tonkawa and many other fields where Halliburton has done the cementing was not due to underground waste.

HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Okla.

MOORE OIL



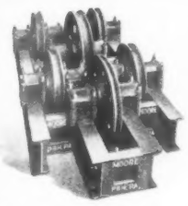
Moore ALL STEEL

LEE C. MOORE & COMPANY, *Inc.*

DALLAS, TEXAS HOUSTON, TEXAS BORGER, TEXAS

WICHITA FALLS, TEXAS CASPER, WYO.

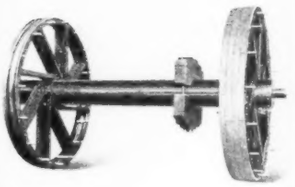
FIELD EQUIPMENT



CROWN BLOCK
Strength, easy running action and long life, with no attention save occasional oiling.

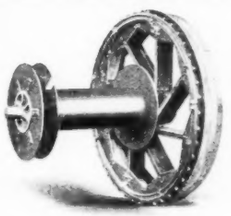
WALKING BEAM
Built for severe service, I beam type, heavily reinforced.

PITMAN
Has a self-aligning bearing with double oil pocket for lubrication.



BULL WHEEL
Heavy shaft, shrunk and riveted on gudgeons.
One piece double V groove tug.

BAND WHEEL
Rugged steel construction. Shipped in one piece ready to mount.



CALF WHEEL
Has an extra heavy steel pipe shaft and channel steel spokes.

MACHINERY SUPPORTS

ENGINE HOUSE

EL RIG EQUIPMENT

.....PITTSBURGH.....TULSA

SHREVEPORT, LA. EL DORADO, KAN. EL DORADO, ARK.

PARKERSBURG, W. VA.

Natural Gasoline as Chemical Material

Residue Gas From Plant Operation and Certain Fractions of Finished Products Available as By-Products

By Emby Kaye*
Skelly Oil Co.

In approaching the problem of manufacturing by-products of natural gas (casinghead gas) and natural gasoline, the chemist will do well to concentrate development work on the utilization of those fractions that are ordinarily lost in the manufacture of natural gasoline (residue gas), and such fractions as should be removed from natural gasoline in order to make it more satisfactory as a motor fuel without blending with heavier naphthas. With the gasoline extraction equipment working at top efficiency, some ethane, practically all of the propane, and heavier hydrocarbons are extracted, leaving a residue gas composed principally of methane and some ethane. At present, except in those cases where recovery plants lie close by commercial gas pipe lines, the residue gas is wasted entirely, or is burned under conditions of arrested combustion to form carbon black. Under this condition of the utilization of residue gas, the average sale value of the gas is 2 cents per thousand feet, whereas the thermal value of this gas varies from 1,000 to 1,500 B.t.u. per foot and is worth infinitely more.

During recent years, considerable experimental work has been done looking to the manufacture of by-products from natural gas by means of controlled chlorination. Several such processes have been evolved, each differing only in minor details of control or catalyst[1]. The most illustrative method consists in the passing of a natural gas and chlorine mixture, preheated to between 200 and 400 degrees Centigrade over coke or activated carbon that has been treated with a zinc chloride solution. The products thus recovered are nearly 100 per cent of the theoretically possible yield, and only a small amount of gas is passed out of the system. The products formed by the reaction of methane with chlorine are: Methyl chloride, methylene chloride, chloroform, carbon tetrachloride and hydrochloric acid.

Chlorine and Methane

Since the reactions are exothermic, provisions for regulating the extraction of heat from the reacting zone must be provided or the reaction chamber will reach such a high temperature that the reactions will take place with explosive violence with the formation of free carbon. When the reaction takes place with explosive violence, no substitution products of methane and chlorine are formed.

The reactions of chlorine with methane are as follows: (1) For the formation of methyl chloride: $CH_4 + CL_2 = CH_2CL + HCL$. (2) For the formation of methylene chloride: $CH_4 + 2CL_2 = CH_2CL_2 + 2HCL$. (3) For the formation of chloroform: $CH_4 + 3CL_2 = CH\,CL_3 + 3HCL$. (4) For the formation of carbon tetrachloride: $CH_4 + 4CL_2 = CCL_4 + 4HCL$. (5) For the deposition of free carbon: $CH_4 + 2CL_2 = C + 4HCL$.

I hope that, without presumption, I can say to those of you who are chemists that the probable future of the chlorination of various natural gas constituents lies in controlling the conditions of chlorination so that a large percentage of methyl chloride be formed, and then effecting hydrolysis of the methyl chloride to form methyl alcohol. This process should provide an economical supply of the important industrial solvent, methyl alcohol. (See chart.) That this field is not saturated is attested by the many inquiries that come to us day by day.

Catalytic Agents

A second series of possible processes for the utilization of natural gas has been introduced in the past two years[2]. These processes are the reverse of "cracking" (the term usually applied to the process of destructive distillation, by which heavy hydrocarbon molecules are broken up to form lighter hydrocarbon molecules in the manufacture of motor gasoline from heavier oils), as they have been developed for "constructive conversion" of hydrocarbon gases into liquid hydrocarbons. The procedure in these processes consists of preheating gases containing methane and other hydrocarbon gases to between 400 and 950 degrees Centigrade, then passing them, under pressure over catalytic agents, such as zinc chloride, active carbon, elementary metals or suitable mixtures of metal oxides. The resultant products are cooled and the liquids condensed and separated from the gaseous constituents. The gaseous products from these processes contain, ethylene, propylene and butylene, which may be absorbed by scrubbing the gases with concentrated sulphuric acid[3,4]. The alkyl acid esters thus formed may be hydrolized by dilution with water, and the alcohol thus formed may be removed by distillation. The alcohols may be separated and further purified by subsequent distillations. The alcohols thus formed are: ethyl alcohol, isopropyl alcohol, secondary butyl alcohol and secondary amyl alcohol. The gases that are not absorbed in the sulphuric acid tower are transported to the burners of the preheater, where they are utilized as fuel to preheat the fresh hydrocarbon gases entering the system.

The liquid constituents obtained from the process are high in olefin content and several different organization units are investigating the possibilities of developing economic processes to convert them into alcohols, glycols, aldehydes, ketones and acids. Olefin hydrocarbons of high molecular weight might be heated with air in the presence of mercuric oxide to form fatty acids of commercial importance[5]. The economic aspect of the manufacture of any of the above possible series of compounds can only be determined by extensive experimentation. However, the liquid fractions could always be fractionated to form motor fuels. There is also a possibility of the recovery of benzol and tuluol from the condensed liquids.

Natural Gasoline Fractions

Having discussed some of the possibilities of utilizing the residue, it is well to consider what improvements and uses can be made of natural gasoline previously extracted from the natural gas. The "raw" natural gasoline as it comes directly from the distillation system "run-tank" contains propane, butanes, pentances, hexanes, heptanes and small percentages of higher hydrocarbons. The "raw" natural gasoline can be fractionized to remove a propane-butane mixture, which makes an excellent "stove gas." This fraction may be bottled under pressure and used as fuel in stoves located in isolated country homes, hunting lodges, camps, or in pleasure yachts.

The liquid is vaporized immediately upon the release of pressure to form a gas high in thermal value, and which burns with a clean, blue, odorless, hot flame. This fuel has approximately 100,000 B.t.u.'s per liquid gallon and is very economical for the indicated purposes. This gas has been successfully substituted for acetylene in cutting steel with the oxygen torch. Other wide uses now indicated as a result of satisfactory trial and experimentation are:

1. In firing ceramic furnaces for making pottery (also in the agateware industry), on account of the distinct advantage of this gas, which is free from sulphur content and will thus not discolor the glazing of the pottery, which does occur with other known means of firing.

2. To use in place of blue-water gas for heating steel, such as forge welding, drop-forging, etc. Here, again, its advantage is the absolute absence of sulphur, and in the simpler equipment required by the users in making this gas ready for use, and greater uniformity.

3. Its use as a source of heat in the absorption type of portable refrigerator equipment. Experiments along this line are being conducted with refrigerator cars equipped with this type of equipment, containing a 1,000-pound capacity hydrocarbon fuel tank charged with this gas, on account of the much lower weight of the fuel and its absolute reliability.

4. In fine metallurgy in reducing ores in electric furnaces.

5. Use as a base for cheaper synthetic plastics.

Utilization of Butane

Following the removal of the propane-butane fraction, a fraction of practically pure normal butane may be removed from the natural gasoline. This fraction may be shipped in tank cars constructed for 150 pounds per square inch working pressure. Butane is an excellent fuel, containing 106,500 B.t.u.'s per gallon. It vaporizes at 1 degree Centigrade and forms 32.5 feet of gas having a thermal value of 2,969 B.t.u.'s per cubic foot.

In the manufacture of artificial gas, gas-oil is jetted into a fire-brick-lined chamber with transverse walls of checker brick maintained at an incandescent heat. The gas-oil undergoes destructive distillation, forming considerable tar, aromatics such as benzol and tuluol, and the fixed incondensable gases which enrich the water gas. The cracking of gas-oil for gas enrichment results in the formation of tar mists of such fine subdivision that mechanical means of removal are unsuccessful. If the gas mains are to be protected from accumulative deposits of these tars, the use of electric precipitators must be resorted to. The recovery of the by-product tars, formed by gas-oil cracking, entails more expense than the value of the recovered products.

The substitution of butane should provide a superior product for this enrichment function, unattended by such difficulties. It is readily vaporized; requires no special equipment other than storage, and gives a clean enrichment free from any tarry or oily substances that tend to collect and restrict gas flow through the mains.

If butane were evaporated in a closed heat-exchange unit, heated by the gas which it is afterwards to enrich, the refrigerating effect of the amount necessary for enrichment will reduce the dew point on the total amount, both by reason of the cooling and, to a less extent, by the increase in volume when vapor is added to gas. (Condensate — chiefly water—after the cooling unit, can be removed in a drip before vapor is mixed in.) Butane is so heavy that trouble might possibly arise from this source in using it for the enrichment of blue-gas. On the other hand, we are informed that the specific gravity can be raised 20 per cent, or lowered 10 per cent, with no trouble in the adjustment of orifices in burners.

The use of butane gives practically the same gas enrichment as the same volume of gas oil. While gas-oil contains somewhat greater thermal values per gallon than butane, the gaseous constituents obtained from cracking a gallon of gas-oil have a practically identical value in B.t.u. as a vaporized gallon of butane.

Butane as Refrigerant

Butane is an excellent, efficient and inexpensive refrigerant. Comparatively little energy is required to operate a butane system as compared with ammonia and for this reason it has found preference in home refrigerator systems. It presents a future possibility as a refrigerant upon a large scale in the manufacture of refrigerator cars for the shipment of meats and vegetables, to which reference already has been made.

The gasoline remaining after the removal of the butane has an initial boiling point of approximately 105 degrees Fahrenheit and an end point of approximately 350 degrees Fahrenheit. It makes an excellent motor fuel for aviation or car motors. However, a pentane cut may be fractionated from the motor fuel gasoline and chlorinated and then hydrolized to form amyl alcohol[6]. The amyl alcohol may be sold as such, or may be acetylated to form amyl acetate, a valuable solvent in pyroxylin lacquers.

The removal of the pentane cut leaves a residual gasoline of about 130 degrees Fahrenheit boiling point and 350 degrees Fahrenheit endpoint. This fraction may be distilled to remove the small percentages of heavier naphthas present, to produce a 295-300 degree Fahrenheit endpoint fraction, which may be be marketed as a rubber solvent for the manufacture of rubber cement. I say "may be marketed," although I should say "is being marketed and has been marketed for some time."

The preceding paragraphs list only a few of the possible product divisions obtainable from natural gasoline. Bearing in mind the cheapness of the raw material and fuel for the conversions, it is evident that a great many of them are practical today. The state of development work in some companies, and courtesies extended, do not permit discussion of more of the work which is not in progress.

Intermediate Hydrocarbons

As we become more involved in this subject, it has been our observation that the chemists have hardly realized the amount of intermediate hydrocarbons that are available, not to speak of some 200,000,000 feet of methane and ethane that are going to waste as residue gas after gasoline extraction. Let me indicate the proportions of gases that are, or may be, obtained through natural gasoline plants. There are being processed something like 1,042,000,000,000 feet of natural or casinghead gas per annum from which 1,000,642,000 gallons of gasoline are recovered. From this, an average of 10 per cent is not removed by weathering or stabilizing, the constituents removed being, chiefly, propane and butane. Further amounts could well be recovered if the fractions became valuable. The amount ultimately available is, roughly, 20 per cent of the total net gasoline production, or about three net gasoline production, or about 325,000,000 gallons annually.

Chemical engineers, not familiar with the oil business, who read in the books on distillation that fractionation of pure

(Continued on Page 121)

*American Petroleum Institute, December 5-7.

[1]Chlorination of Natural Gas, Technical Paper 255, Bureau of Mines.

[2]British Patent 255,493 of July 18, 1925. Also British Patent 255,829 and U. S. Patent 1,571,994.

[3]Chemical and Metallurgical Engineering, Volume 33, No. 7, of July, 1926.

[4]Ethylene has been used with considerable success in ripening fruit. The advantages of shipping green fruit to market and artificially ripening it upon arrival, with the diminution of losses due to decay, are manifest.

[5]Organic Chemistry. J. F. Norris, 1922.

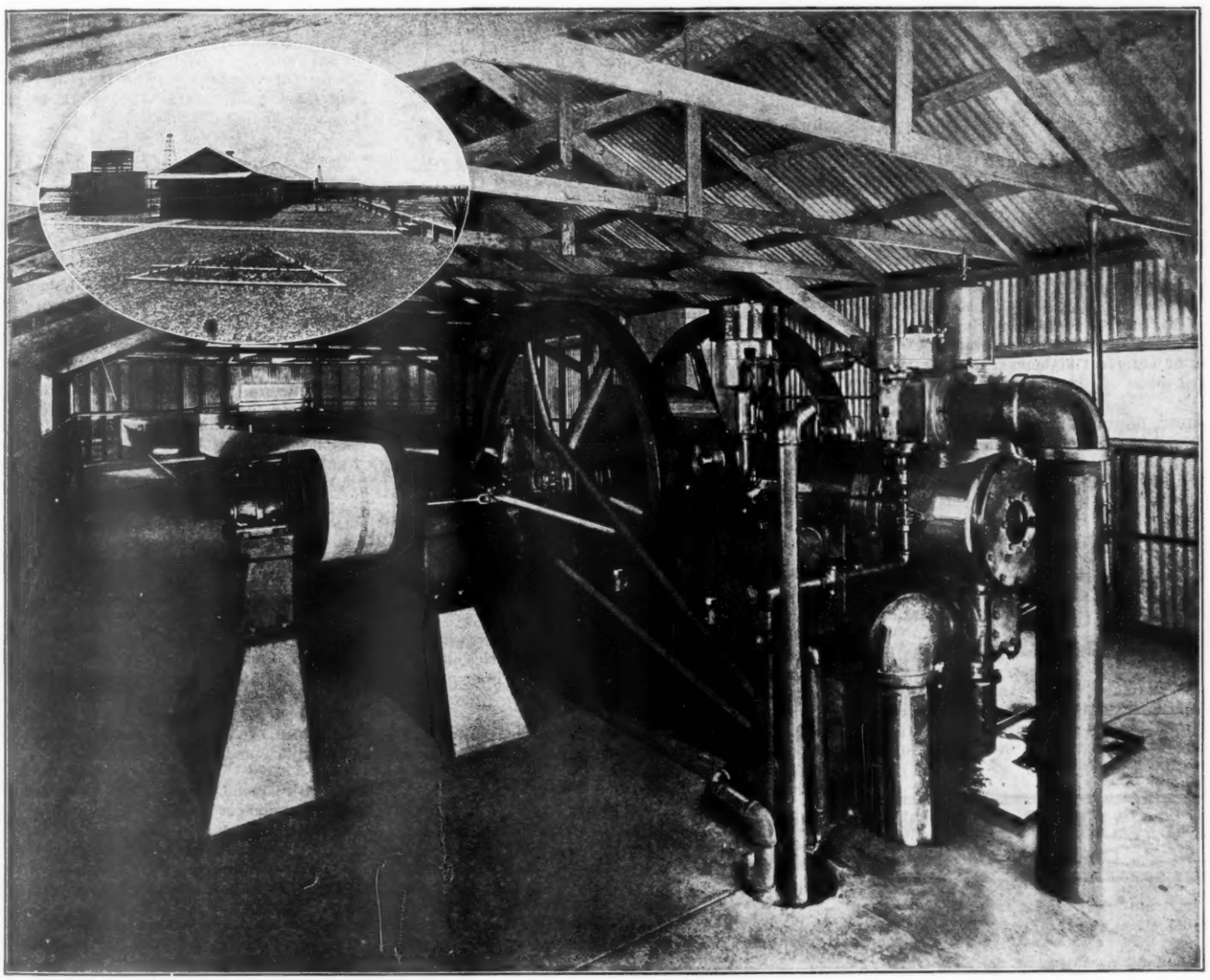
[6]Chemical and Metallurgical Engineering, Volume 34, No. 5, May, 1927.

Profit for the Producer

Profit for the oil producer lies in the difference between the price he receives for his oil and the cost of producing it. To insure maximum profit the machinery used must get the oil out of the ground with a minimum cost of operation and upkeep. Reid Power Plants such as the one illustrated below have proven their ability to do this. We will be pleased to explain the features which are responsible for their economical operation. Write or call our nearest branch or agency.

Joseph Reid Gas Engine Company, Oil City, Pennsylvania, U. S. A.

Branches and Agencies: Marietta, Ohio; Newark, Ohio; Shreveport, La.; Charleston, W. Va.; R. B. Moore, Bolivar, N. Y.; Frick & Lindsay Co., Bradford, Penna., and Kentucky Distributors; S. R. Shoup, 724 Board of Trade Bldg., Los Angeles, Calif.; Frick-Reid Supply Co., Tulsa, Okla., and Branches, Distributors for Oklahoma, Kansas, Texas, Arkansas and Wyoming. Export Sales Representatives—Oilfield Equipment Co., 30 Church St., New York City. Branch Shop: Tulsa, Okla.



Marland Oil Co. Power Plant near McCamey, Texas: using a Reid 45 H.P. Four Cycle Engine and Type PW 24 ft. Bandwheel Power.

REID OIL FIELD MACHINERY

MEN KNOWN IN OILDOM

W. A. Moncrief

W. A. Moncrief, executive vice president of the Marland Oil Company of Texas, has his hands full these days as chairman of the Yates Pool proration committee. This committee has the job of distributing fairly and equitably among 12 producers with a total potential output of some 450,000 barrels daily, a pipe line capacity of only 42,000 barrels daily. At a recent meeting of Yates Pool representatives they voted to extend the proration period beyond the first of the year.

Mr. Moncrief has never worked for any other concern since college days except the Marland Oil Company and Marland Refining Company. He was born August 25, 1895, at Sulphur Springs, Tex., and moved to Oklahoma in 1900. After graduation from high school, he entered Oklahoma University where he embarked upon a six-year academic and law course.

Early in 1917, he was teaching English in Northeastern State Normal School in Oklahoma when the war broke out and he left in May of that year for Camp Pike, at Little Rock, Ark., entering the first officers' training camp there. He went across in 1918 and saw service in France.

Returning to this country in 1919, he entered the service of the Marland Refining Company as registrar in charge of stock. A little later he became manager of the accounting department and then assistant secretary of the Marland Refining Company.

Transferring to the land department of the Marland Oil Company, Mr. Moncrief went to Texas in 1923 and was stationed at San Antonio for a time. When the Marland Oil Company of Texas was organized he was made vice president, and his headquarters have been successively in Dallas, Houston and Fort Worth.

PERSONAL PARAGRAPHS

John G. Bartram, Midwest Refining Company geologist, visited the Casper, Wyo., offices recently.

* * *

Jacques Vinmont, president of the California Petroleum Corporation, is spending some time in New York City.

* * *

Cyclone Smith, of the Borden Company, is back in Tulsa, Okla., after a trip through the Mid-Continent fields.

* * *

G. M. Anderson, of the Baker Casing Shoe Company of Los Angeles, has been appointed Mid-Continent representative with headquarters at the B. & A. Specialty Company of Tulsa, Mid-Continent distributors of Baker products.

R. B. Pringle, vice president of the Independent Oil & Gas Company, has returned from a trip to New York.

* * *

E. W. Welch, New York City, with the Northern Group of Pipe Lines, was a Pittsburgh, Pa. visitor this week.

* * *

A. B. Williams, of the Williams Brothers Oil Company, McComb City, Miss., was in Shreveport, La., on business.

* * *

P. V. McGivern, president of the B. & A. Specialty Company of Tulsa, has returned from a 10 days' trip to California.

* * *

F. B. Parriot, president of the Transcontinental Oil Company, is back in Tulsa, Okla., after a trip to New York City.

* * *

Joseph McGill has returned to Petrolia, Ontario, from the Egyptian fields, where he has been drilling for several years.

* * *

D. B. Hamilton, vice president of the Root Refineries, Inc., has returned to Shreveport, La., from a business trip to Chicago.

* * *

J. M. Tussey, Oil City, Pa., treasurer for the Southern Group of Pipe Lines, spent a few hours in Pittsburgh, Pa., last week.

* * *

W. F. Brenner, Pittsburgh, Pa., agent for the Eureka Pipe Line Company, has retired and he and his family will spend the winter in Florida.

* * *

R. E. Bishop, sales manager of the Crystal Oil Refining Corporation, of Shreveport, La., and Mrs. Bishop, are spending a vacation in California.

* * *

Hugh Currough, engineer at the Okmulgee, Okla., refinery of the Empire Companies, has been transferred to Tulsa, Okla., to replace F. B. Frame.

* * *

Mrs. G. S. Crosbie, formerly of Petrolia, Ontario, who has been in Texas with her son, Kerby Crosbie, for some years, is moving with him to Tulsa, Okla.

* * *

William Cahill, traveling auditor for the Midwest Refining Company, has been transferred to the company's Denver, Colo., offices from Casper, Wyo.

* * *

Herb Dailey, head of the land department for Midwest Refining Company, attended business matters in southwestern Wyoming and Utah recently.

* * *

F. B. Frame, engineer of the Empire Refineries, Inc., has been transferred to the Cities Service Refining Company, with headquarters at Boston, Mass.

* * *

S. G. Madgwick, federal petroleum and natural gas engineer at Calgary, Alberta, is convalescing in a Calgary hospital after an operation for appendicitis.

* * *

John McFadyen, general manager for Ohio Oil Company in the Rocky Mountain district, has returned from California where he has been on company business.

* * *

C. Frank Kelsey, former vice president of the Independent Oil & Gas Company, with headquarters at Fort Worth, Tex., spent a few days in Tulsa, Okla., recently.

* * *

T. C. Towl, Pittsburgh, Pa., superintendent Southwest Pipe Line Company, and Mrs. Towl are celebrating the fifth anniversary of their marriage at Atlantic City.

* * *

W. B. Miller, Los Angeles, Calif., formerly president of the National Transit Company, but for some years a resident on the Pacific Coast, was in Pittsburgh, Pa., calling on old-time friends.

* * *

John T. Barnett, president of the Midwest Refining Company, and C. H. Wegeman, an official of that company, were visitors at the Casper, Wyo., offices from their Denver, Colo., headquarters.

* * *

T. H. Grobe, assistant treasurer of the Louisiana Oil Refining Corporation, has been in New York for several weeks and, it is understood, will go from there to Trinidad with the Trinidad Oil Fields Operating Company.

Arnold Hackstaff, representing the Youngstown Sheet & Tube Company of Ohio, has been on business in Wyoming.

* * *

A. D. Shaull, of the Oxweld Acetylene interests, was among the business visitors in the offices of Rocky Mountain oil companies.

* * *

J. D. Beebe, manager of the mechanical department of the Goodrich Rubber Company, has been visiting the Rocky Mountain oil areas.

* * *

C. W. Kennedye, president of the Kennedye-Plumb Company, of St. Louis, Mo., makers of rotary drilling tools, spent a few days in Tulsa, Okla., last week.

* * *

M. N. Wheeler, of Casper, Wyo., is in Salt Lake City, Utah, on business. Mr. Wheeler is identified with several oil operations in the Rocky Mountain territory.

* * *

Milton Brennan, district representative of the D. & B. Pump & Supply Company, of Los Angeles, Calif., has returned to Casper, Wyo., from a visit to the company's California offices.

* * *

H. A. Simpson, Oil City, assistant shipping agent to V. S. Swisher, stopped off in Pittsburgh on his way to Columbus, Ohio, to visit his son who is attending Ohio State College at that place.

* * *

Will McKnight, well known oil man of the Sunburst Field, will become general manager for the Fertig Oil Company on the first of the year and will take charge of the field work in the Oregon Basin Field in Wyoming.

* * *

B. P. Crittenden, vice president in charge of refining of the Louisiana Oil Refining Corporation, is in Boston, Mass., conferring with officials of the Beacon Oil Company, a Louisiana subsidiary, operating in the New England States.

* * *

Comfort E. Brown, manager, Eastern Division, and E. D. Rogers, manager, Southern Division, of the Merco Nordstrom Valve Company, have recently been in San Francisco in conference with the executive offices of the company in that city.

* * *

Paul L. Slonaker, Louisiana-Arkansas district manager of the Joseph Reid Gas Engine Company, has been visiting the Reid plant in Oil City, Pa. At the same time, Oran Krug, from the Tulsa shop of the Reid company, was at the Oil City plant.

* * *

Forrest M. Towl, president of the Southern Group of Pipe Lines and Allen T. Towl, vice president and general manager of the same company, both of New York City, attended a stockholders' meeting of the Southwest Pennsylvania Pipe Line Company last week.

* * *

G. G. Langan, Mid-Continent manager of the Hills-Hubble Company of San Francisco, Calif., has left Tulsa, Okla., for the Pacific Coast where he will spend the winter months. Mr. Langan was accompanied by Mrs. Langan who will also winter in California.

* * *

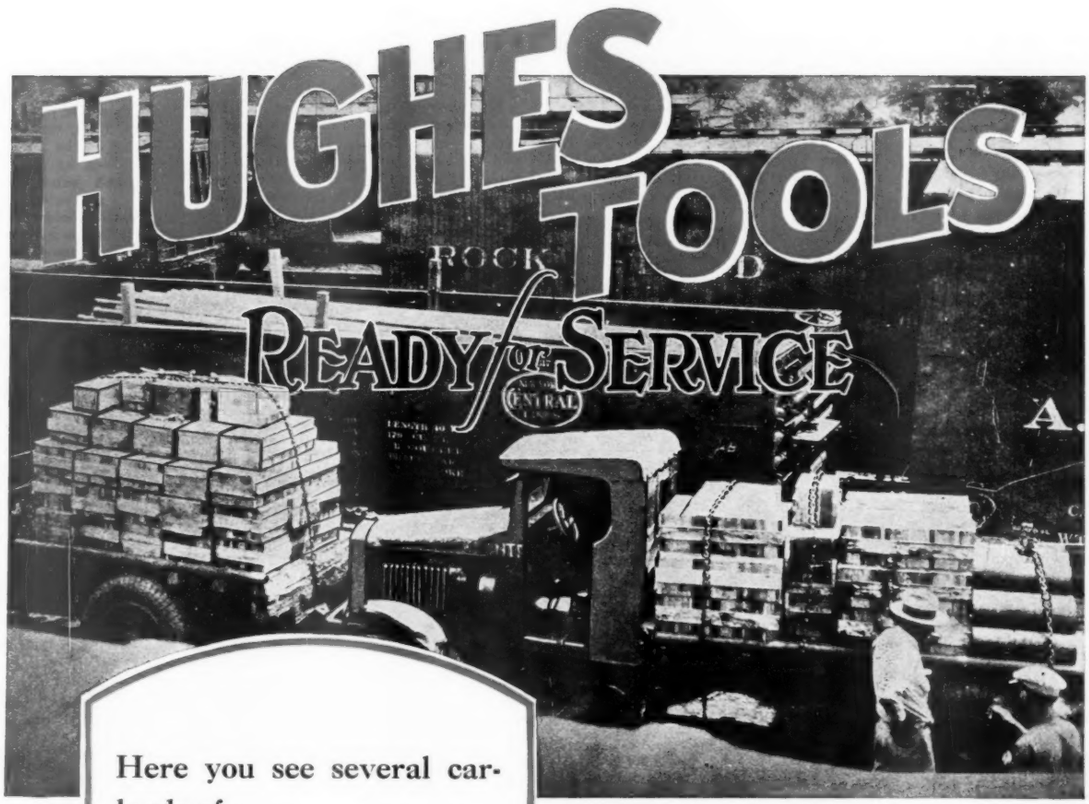
T. B. Greene, Lima, Ohio, vice president and general manager of the Buckeye Pipe Line Company, and Harry L. Pew, agent for the same company, were business visitors in Pittsburgh, Pa. T. C. Barnes, Marietta, Ohio, general superintendent for the same company, visited Pittsburgh at the same time.

* * *

K. E. Merren, president of the Shreveport Producing & Refining Company, Ben Gray, vice president of the Shreveport-El Dorado Pipe Line Company, Jerry Brown, of the Gulf Refining Company, Shreveport, La., offices, and C. P. Clayton, of Shreveport, are in the midst of a three weeks' deer hunt in the Big Bend country along the Mexican border.

* * *

Dan Mahoney, of the Sinclair Crude Oil Purchasing Company, who has been stationed on the Pacific Coast for the past seven months is now located in the Fort Worth, Tex., office of that company. He was formerly at Los Angeles, Calif.



Here you see several carloads of

HUGHES ROCK BITS and parts and

HUGHES TOOL JOINTS being unloaded for service in the Seminole district. The preference for Hughes tools in this field reflects their superior performance.

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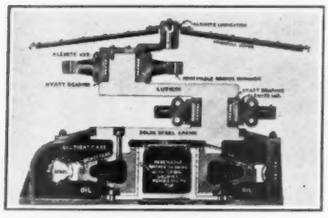
Oklahoma City, Okla.	TEXAS	New York City

EQUIPMENT AND SUPPLIES

WORM-GEARED PUMPING POWER NOW IN MARKET

A new design in powers shown in the accompanying illustrations, manufactured by the Lufkin Foundry & Machine Co., of Lufkin, Tex. The company's successful experience with the worm gear on its pumping units suggested the idea of a worm-geared power, doing away with large band wheels and costly belts which run on quarter twist (a most abnormal inefficient drive) with high speed tight-



eners that make a large building with concrete floors necessary.

The power is designed to set on a concrete foundation and being self-contained there is no possibility of misalignment of parts as in the present style of powers with their numerous brace rods which sag and stretch making it almost impossible to keep a band wheel power in alignment.

The worm and gear are the same as used in the company's 6½-inch heavy

duty unit, worm and gear, their bearings being interchangeable. The worm gear is 52 inches in diameter, triple thread, 30 to 1 ratio, and turns on a renewable bronze bearing 16 inches in diameter, 16 inches high, 100 per cent greater than necessary, which with all other bearings float in oil insuring remarkably long life.

The crank is of cast steel bolted direct to gear center and is made for 24-inch stroke. The crank bearing or pull rod centers are of cast steel also and run on roller bearings filled with light grease through an alemite gun. The rod connection holes are bronze bushed and when worn can be cheaply replaced. Each center has holes for 12 wells, (24 in all).

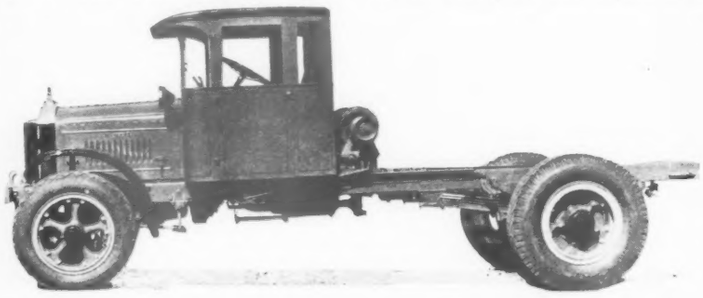
The umbrella simply is a cover to keep off rain as it is not considered necessary to house this power.

The line shaft is 3 7/16-inch diameter and is equipped with timken bearings. This power can be operated either with electric motor, four-cylinder gas engine or the single-cylinder engine, any of which may be coupled to line shaft as desired.

While more expensive than the existing power units the total installation costs are said to be much less, the fire hazard is removed and upkeep expense reduced to the minimum.

NEW TRUCK FOR OIL FIELD DUTY OFFERED

The accompanying illustration shows the new model 638 4/5-ton six-cylinder oil field truck recently developed by the Indiana Truck Corp., Marion, Ind. The truck is equipped with a heavy-duty winch, with special power take-off



mounted in line with the propeller shaft. Few trucks are subject to harder usage than those in the oil fields and they need an abundance of power, with speed when necessary. The rear tires of the new model 638 are 44 by 10-inch pneumatic cord.

The Indiana Truck Corp. has established a new branch in Tulsa, in charge of L. A. Murdoch.

Orders for Indiana trucks entered in September, 1927, show an increase of 41 per cent over the orders received in September, 1926. Third quarter sales this year show a 35 per cent increase over the third quarter business of last year. This is on top of similar gains made during the first half of this year over last year. The Indiana Truck Corp. has specialized on oil field trucks, road builders and commercial trucks ranging in size from one to seven tons, with six-cylinder motors available in trucks up to four-ton size.

Advance extracts from "Tractor Farming," issued by the International Harvester Co. of America, contain advice of value on the care of the tractor, now widely used in oil field operations. The articles deal with overheating, irregular speed, poor lubrication, careless management, etc.

EQUIPMENT DESIGNED TO SOLVE PROBLEMS

The Sheldon Machinery Corp., 15 Park Row, New York, manufactures an improved type of rotary drilling machinery and accessory equipment designed by the Sheldon-Burden Co. to meet difficult problems and used by the latter concern in its various operations in the United States, Mexico and South America. In 1922 the drilling firm of Sheldon-Burden was formed. To reduce the weight of drill equipment and to combat the high gas pressure encountered in the Mexican fields south of Tampico it began work with diamond drills, at that time an innovation in oil well drilling. It was found there were many things a rotary could do that these drills could not. Eventually it was decided to design and build an oil field drilling machine with the hydraulic feed and pressure control devices of the diamond drill, combined with all advantages of the up to date oil well rotary. Out of the experiments that followed came the Sheldon-Burden hydraulic feed rotary drills and auxiliary equipment which the manufacturers assert solve some of the most serious problems encountered in the oil field.

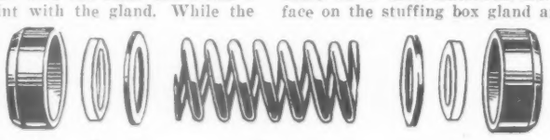
Two new members of the Witte family of engines are described in a circular issued by the Witte Engine Works of Kansas City and Pittsburgh. They are types F and H, equipped with a specially-designed super-hopper to take care of increased horsepower and temperature control, while increasing the capacity of the water supply.

DEVICE DESIGNED TO MEET SEALING PROBLEM

The problem of sealing around a rotary shaft, always a difficult one, was met by George J. Cooke, president of the Cooke Cold Storage Co., Chicago, with a device known as the Cooke seal ring, which turns with the shaft and forms a ground joint with the gland. While the ground joint itself is not new, the idea of binding the packing frictionally tight on the shaft is entirely new and fully patented.

The Cooke seal ring consists of the parts shown in the accompanying illustration. The helical spring (D) compresses the rubber, or soft packing (B) in the housings of the seal rings (A), binding the entire assembly frictionally tight on and sealing the shaft, thus causing the assembly to rotate with the shaft and form a ground joint with the gland and back of the stuffing box. The follower rings (C) also enter the housing of the seal ring between rubbers and spring thus protecting the former from action of oil or any other substance.

The entire assembly revolves with the shaft on a three-sixteenths-inch ground face on the stuffing box gland and is lubricated and sealed with oil from the stuffing box now used as an oil reservoir.



A B C D C B A

A—The Cooke seal ring. B—Rubber packing. C—Follower ring. D—Helical spring.

The Cooke seal ring is manufactured in three styles. Style No. 1, single seal, is used where there is a shoulder on the shaft, and is adapted to ammonia, carbon and sulphur dioxide, air and other compressors. Style No. 2, single seal, is used for the same purposes as No. 1 where there is no shoulder on the shaft. Style No. 3, double seal, is used for rotary and centrifugal pumps.

The device is now in use by many oil companies.

WATER LUBRICATION EMPLOYED

Adoption of water lubrication in place of oil constitutes a feature of a large capacity water pump installed in the Standard Oil Co. refinery at Baton Rouge. It is one of the first pumps of its type to be chosen by an oil operating company, although hundreds of water lubricated pumps are said to be in operation in the irrigation fields of the Pacific Southwest. The pump is a stock design, manufactured by the Pomona Manufacturing Co. at Pomona, Calif. This pump is producing 1,300 gallons of water per minute against a total head of 327 feet, 200 feet of which is below the surface. The water is produced from a 12-inch well, being pumped with a set of 5-stage 16-inch turbines which draw the water up through the column to the pump head where a 10-stage 12-inch turbine booster unit is connected to boost the water to the surface. The booster, being an integral part of the pump, makes unnecessary the use of an auxiliary pumping unit.

ALLOYS FOR HARD USAGE

Alloys manufactured by the Hills-McCanna Co., 2349 Nelson Street, Chicago, are designed for uses requiring immunity from corrosion and from deformation under alternating tensions. The company's "40" series (copper, aluminum and iron mixes) are intended to resist especially severe wear or repeated shock. Castings of this series are said to be tough, dense and uniformly sound.

DITCHERS ATTRACT ATTENTION

Six ditching machines on two gondola cars attracted much attention recently while they were on their way to Monahan, Tex., as part of a freight train. The ditchers, manufactured by the Barber-Greene Co., Aurora, Ill., were owned by the Ozark Pipe Line Corp., which was shipping them to Monahan for use in a pipe line project there.

PLYMPTON WITH "LINC-WELD"

The Lincoln Electric Co., Cleveland, Ohio, announces the appointment of R. M. Plympton as salesman in charge of consumer motor business in Chicago. Mr. Plympton will work under the direction of R. D. Malm, Chicago district manager. He was formerly assistant sales manager for the Babson Statistical Association, Wellsley Hills, Mass.

GENERAL OFFICES MOVED

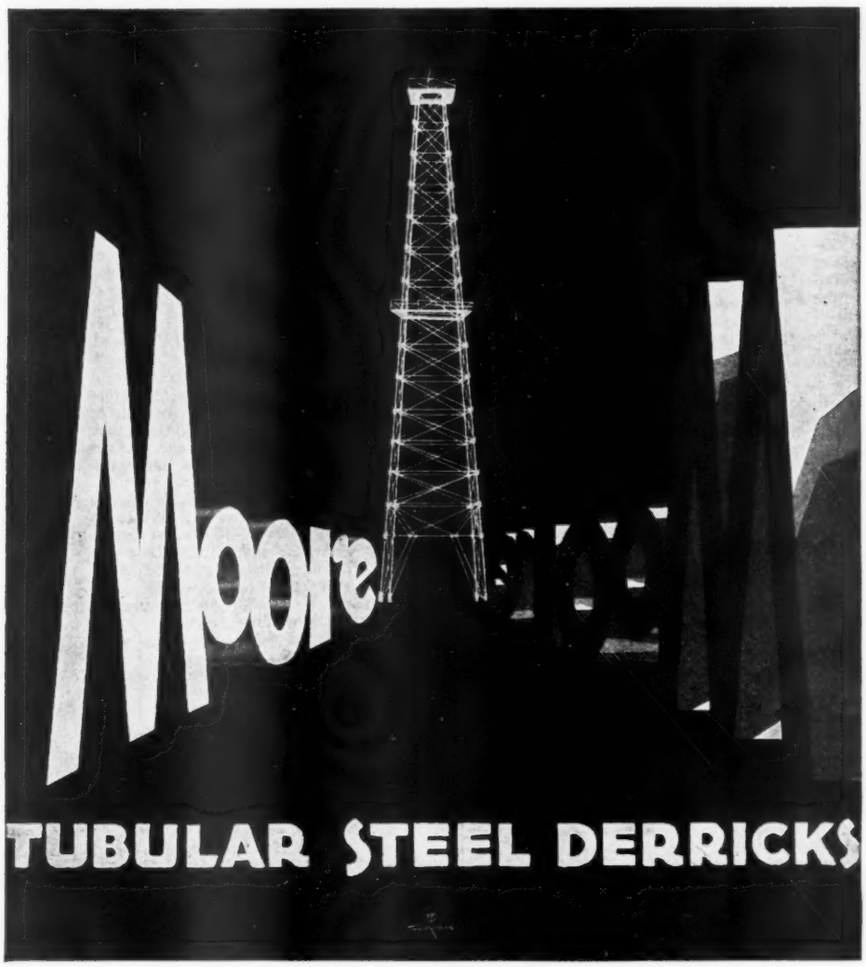
The West Coast Lumber Trade Extension Bureau announces the removal of the general offices from 562 Stuart Building, Seattle, to Longview, Wash. A district office will be maintained in Seattle, at 5505 Henry Building in charge of J. R. Blunt. A district office in Portland soon will be opened.

BULLETINS RECEIVED

An article on "Effect of Nickel on Machinability of Cast Iron," reprinted from "The American Machinist," is distributed by the International Nickel Co. of New York.

General Electric Co. issues bulletins on centrifugal air-compressors, horizontal edgewise instruments, auxiliary welding resistors and a new line of motors for portable electric hoists.

The latest catalog of the Homestead Valve Manufacturing Co., Homestead, Pa., lists for the first time the Homestead Protected Seat Hydraulic Operating Valve, with remote control attachment; larger size Homestead quarter-turn plug valves, equipped with gear-operating device, and the Homestead Ross air valve.



In every industry there is a body of clear thinking men who realize that ultimate economy is attained only through the use of high quality equipment. In the petroleum industry this group is especially large and influential. It is among such men that the Moore Tubular Steel Derrick is used as a standard of comparison.

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Natural Gas Developments

COLUMBIA PURCHASE ANNOUNCED OFFICIALLY

By Whit

TOLEDO, Ohio, Dec. 3.—The purchase of the Ohio gas producing and distributing properties of the City Service Co., which includes the artificial gas division of the Toledo-Edison Co., by the Columbia Gas & Electric Co., owners of the Northwestern Ohio Natural Gas Co. of Toledo, has been announced officially in Columbus.

The purchase will mean the actual merger of the gas business of the two Toledo companies under the name of the Northwestern Ohio Natural Gas Co., about January 1. The Northwestern recently purchased the former home of the Ohio-Bell Telephone Co. on Huron Street, between Madison and Jefferson Avenues. The purchase is, of course, contingent on the approval by Ohio Utilities Commission.

It is understood in Toledo that when the two properties are merged Toledo will be served a mixed natural and artificial gas. No effort will be made to maintain two distinct services. The natural and artificial gases are being used at a number of points in the country, especially in southwestern Illinois, where the Mid-Egypt Oil & Gas Co. for a few years has mixed the two gases with success, from its plant at Murphysboro and other points in Jackson County.

For more than a year the Northwestern and Toledo Edison companies have by mutual agreement refrained from laying parallel gas lines. When the merger is physically operative the two systems will be connected, it is understood, and parallel lines removed.

The Toledo-Edison deal is only one phase of the transaction. The purchase includes all of the gas producing and distributing properties of City Service Co. in Ohio at a purchase price said to be approximately $20,000,000.

The transaction includes the natural gas distributing systems in Sandusky, Medina, Alliance, Mansfield and other cities and towns in the north central part of the State.

Toledo may have a new natural gas rate in the very near future, with probable increase in rates for the small home consumer and a decrease for the large consumer, it was indicated. James W. McMahon, manager of the Northwestern Ohio Natural Gas Co., filed a letter with the city council advising that the period for which the present schedule of prices was fixed is about to expire. He asked the council to follow precedent by appointing a subcommittee to confer with him and go over the books of the company in an effort to establish a new rate.

The present natural gas rate is based on a sliding scale. For the first 3,000 feet the rate is 37 cents per 1,000 feet; for the next 2,000 feet, 47 cents per 1,000 feet; the next 5,000 feet, 57 cents per 1,000; the next 5,000 feet, 67 cents per 1,000; the next 5,000, 72 cents per 1,000; and all over 20,000 feet, 77 cents per 1,000. Besides this scale, the consumer pays 75 cents a month for a ready-to-serve charge. A discount of 2 cents per 1,000 feet is allowable by the company to consumers who pay promptly.

Mr. McMahon said he probably will suggest to the committee the increase in the rate of the first 3,000 feet from 35 to 45 cents. This would affect the small home consumer. The rate for consumption of all over 20,000 feet probably will be reduced from 77 cents to 70 cents per 1,000 feet, Mr. McMahon said.

It was pointed out that the gas company has spent approximately $2,000,000 in improvements in Toledo and can supply the demand. The decrease in rates for the large consumer is expected to procure for the gas company many industrial companies who were forced to use coal and oil when the price of gas became prohibitive.

HOUSE HEATING WITH GAS NEEDS ENGINEERING STUDY AND SERVICE

By William F. Jones, Jr.*

Industrial Engineer, Dominion Natural Gas Co., Buffalo, N. Y.

There are two kinds of house heating, just house heating and intelligent heating. Colonel Harkness at our last meeting struck the keynote of intelligent house heating by recommending that we all give considerable thought to gas conservation by improving our appliances and by educating our customers to use gas efficiently. Colonel Harkness did not propose restricted selling of gas as a solution of gas conservation, but chiefly stressed the intelligent use of this valuable commodity.

In the past little or no attention was paid to this valuable source of revenue by those most vitally concerned.—the gas companies. This problem was left entirely in the inexperienced hands of our customers, and plumbers who were under the impression that a good house heating appliance consisted of a few pieces of pipe preferably used with mixers and which when ignited with a bundle of paper, held as far as possible from the igniter, would burn with some sort of flame. The proportionate mixture of gas and air, proper baffling and secondary air was never considered. The results of such poor installations have accomplished the following, namely: Vast wastage of our valuable product, made operating costs so high to the consumer that the public in general is now fully convinced that the use of gas in a central heating plant is absurd, and lastly created the impression in the minds of our operators that a ragged peak load goes hand-in-hand with house heating and cannot be remedied. At this point I would like to say a few words concerning this undesirable peak load.

Primitive Methods

In the first place if we create obstacles to bar our progress before we really have given them enough thought to know whether they are imaginary or real or if they are real, and do not attempt to solve them, we are indeed defeated and the gas industry will be forced to revert to the days when we hopelessly fought to retain our lighting business alone.

However, our load factor can be improved and many companies have learned this to their advantage. Some believe in off peak rates which will capture large volumes of industrial business. Others have not only gone after off peak industrial business, but have co-ordinated these efforts with intensive selling of automatic water heaters, incinerators, gas ice refrigerators, and, it now looks quite probable, home cooling. There is, however, enough time to think of this winter peak when it becomes necessary. The amount of house heating we have secured up to date certainly does not warrant much worry on the part of our operators.

I have discussed the old method of central heating and have mentioned ways and means of evening up our winter peak when it comes. Let us now contemplate modern house heating.

Modern Equipment

There are two kinds of house heating installations: Automatic conversion jobs and automatic straight gas-fired boilers and furnaces. While we hold that the complete straight fired installation is the better, we yet maintain and are enthusiastic over the fact that efficient automatically controlled and properly installed conversion burners are highly successful. It is first of utmost importance to select a burner which is designed correctly to give us the maximum efficiency from the gas. The relationship between the areas of the burner, mixing tube, and port, to that of the throat must be correct. With these atmospheric burners a correct injecting tube must always be used so that the air-gas ratio of the mixture entering the burner is increased. This results in a higher rate of combustion at the ports, decreased flame height and decreased flame area, and therefore greater rate of consumption per unit of burner surface. These conditions are even more important when the radiant type burner is used, as it is imperative that we have very high flame temperature and the largest possible scrubbing surface of the radiant which directs its heat into the sides of the water leg or fire pot. I believe that this radiant type burner with ports directing the flame upwards and parallel to the walls of the furnace is quite new in the gas industry.

Radiant Type Burners

In a series of laboratory tests which we conducted two years ago, we completely proved to our own satisfaction that the radiant type burner had a high-patients the ways and means of successful home heating or are we going to be

(Continued on Page 169)

*Before the Natural Gas and Petroleum Association of Canada at Windsor, Ont.

MUNICIPAL OWNERSHIP FAILS AT LONG BEACH

LONG BEACH, Calif., Dec. 3.—This city's enthusiastic venture in to municipal ownership and operation of public utilities, taken four years ago, is not the success which voters who authorized a $3,000,000 bond issue for the purchase of the local gas system were given to expect.

An unlimited supply of natural gas at 50 cents pere 1,000 cubic feet for domestic consumption was the promise held forth to the voters, but a report, submitted to the city manager by Joseph M. Berkley, gas consulting engineer, will be the swan song of 50-cent gas in Long Beach if adopted. Berkley, in his report, urges that the prevailing rate be raised to $1 per 1,000 cubic feet for the first 1,000 feet and 80 cents per 1,000 for the next 4,000 feet. Passage of an emergency ordinance for establishment of the proposed new gas rate is urged in the report.

"I feel that in introducing this report it is only fair to myself as an engineer to say that in all my experience I have never seen a gas department that has been so mishandled as this department of your city has been. If it were privately owned it would have been sold by the sheriff long ago," Mr. Berkley's letter accompanying the report read.

In recommending an increase in rates, the report recommends that a number of steps be taken to rehabilitate the city gas department. One of these is that the city should obtain as soon as possible the services of a highly-trained gas executive who has had actual experience in California natural gas practice.

Berkley, who was employed by the new administration to make a thorough survey and study of the gas department, takes up the claim that millions of cubic feet of gas were blown into the air during the past summer because of lack of storage space.

"All I can say on this subject is that it is too pitiful to try to explain and may yet become the most serious thing confronting the gas department. The only answer that can be applied now is that too much buying power was placed in the hands of one man and no brakes were put on the former city manager. Ignorance of facts is no excuse in this case," Berkley's report states.

"If Long Beach is unwilling to raise the rates and follow the recommended course to rehabilitate the department it would be better to sell the system to a private corporation," Mr. Berkley told the city council when he submitted his report.

VENTURA AVENUE GAS RICH FIND FOR EDISON

Millions of dollars have been invested by the Southern California Edison Co. to produce hydroelectric power for its distributing lines, but only an incidental investment in what is now the Ventura Avenue oil field is producing natural gas for the huge Edison steam plant at Long Beach. And what is more important, it costs the Edison company nothing for the production of this gas.

The land was acquired when the properties of the Ventura County Power Co. were purchased a few years ago. Upon the discovery of oil in this district, the land was leased for drilling purposes to the Shell Co. of California on a royalty basis, giving the Edison company a percentage of the oil produced and all the gas from the wells not sold by the Shell Co. On the gas that is sold the Edison company also receives a royalty.

The agreement with the Shell Co. has worked out very satisfactorily for Southern California Edison. Fourteen wells are producing on the property, from which 20,000,000 cubic feet of gas are piped daily to the Long Beach steam plant. This large flow of gas, costing only the pipe line charges, supplied one-half of the plant's requirements before the recent rains, and now is sufficient to supply all requirements.

Before the rains, according to data supplied by Fred B. Lewis, assistant general manager, the Long Beach plant consumed about 45,000,000 cubic feet of gas daily, one-half coming from the Ventura wells and the remainder from the city of Long Beach under purchase contracts. The rains operated to decrease the load on the lines through a decline in irrigation power sales, and at the same time increased the flow in the mountain streams. With the streams running high, the need for steam plant operation has been reduced, and the gas requirements have dropped to around 15,000,000 feet daily.

The significant feature of the Ventura gas flow, Mr. Lewis points out, is that the company is able to burn natural gas only under the boilers in the Long Beach plant. Aside from the pipe line cost, the only expense is the amount necessary to purchase from the city of Long Beach to satisfy the plant's requirements when the load is heavy.

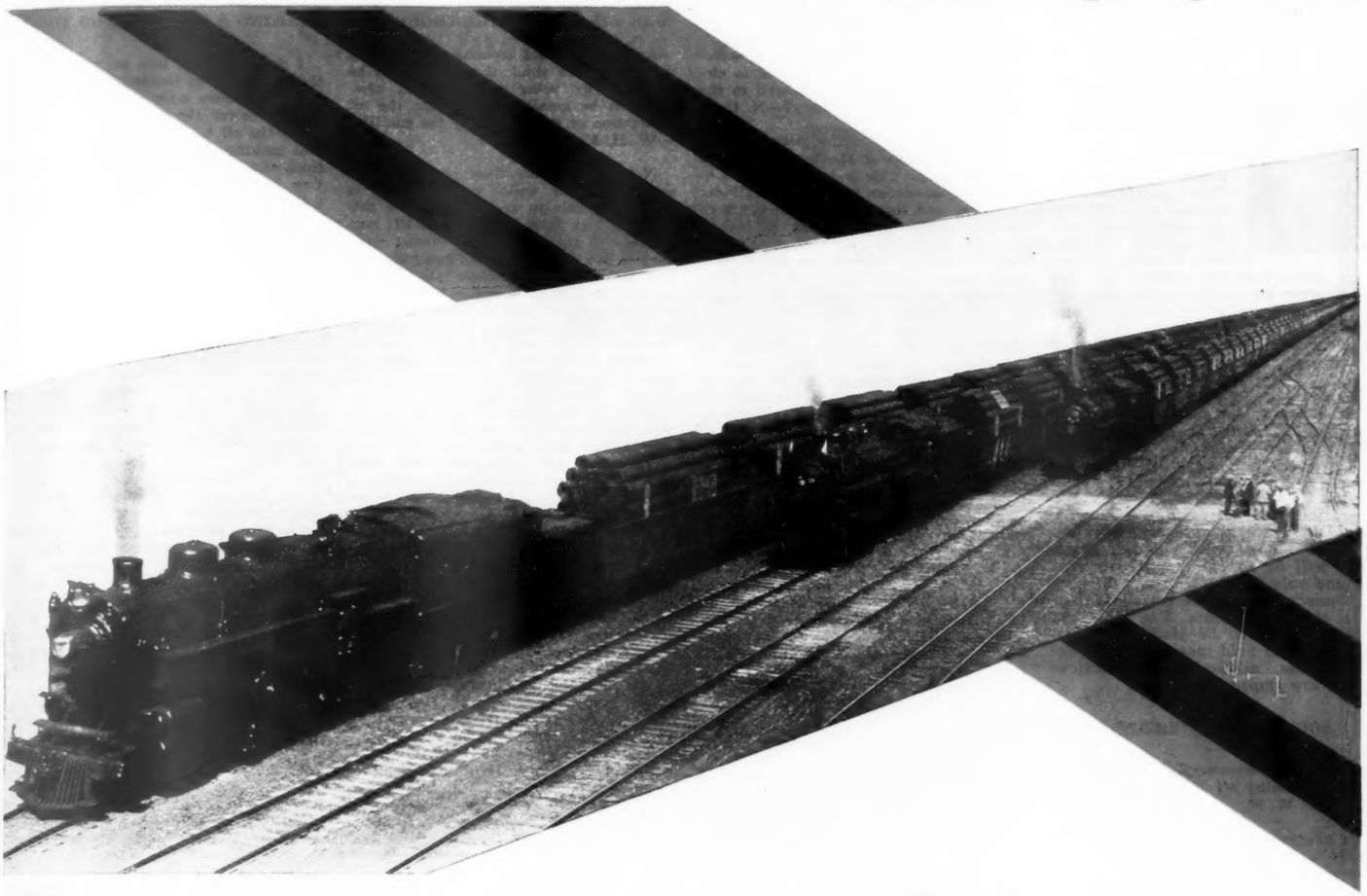
In the month of October, the Edison lease produced approximately 1,000,000,000 feet of gas and about 8,000 bbls. of oil daily. While the Shell Co. has the right to sell the gas and pay a royalty to the Edison company, most of the gas has gone directly to Long Beach by way of the Ventura Fuel Co.'s pipe line system. The Edison management estimates that if all the gas were sold to outside customers the royalty payments would offset the amount necessary to pay in the open market for the Long Beach requirements.

GAS FOR BIG SPRING, TEX.

BIG SPRING, Tex., Dec. 3.—The Consumers Gas Co., recently awarded the franchise in Big Spring, has announced that work will begin within the near future and that the lines and distribution system will cost approximately $300,000. The gas will be piped from the Howard County gas field 16 miles southeast of Big Spring. An 8-inch main will be laid to the field; and according to contract, gas will be ready for domestic and commercial use not later than March 15.

No Waiting for Pipe

on the New Dixie Gulf Gas Company Line



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(*one-half of this shipment is shown above*)

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Field Problems and Their Solution

EDITED BY THOMAS F. SMILEY

In order that men connected with the drilling, producing and transporting branches of the petroleum industry may procure quickly a solution of many problems confronting them from time to time in their work, The Oil and Gas Journal has arranged with leading engineers and other recognized authorities to answer questions submitted by readers of this publication pertaining to the work of drilling and producing crude oil and transporting this product.

Everyone is invited to submit questions freely. These questions will be submitted to proper authorities by Mr. Smiley, who edits the page, and answers, based on the best available information, will be published. Each question should give as much detail as possible, especially where it relates to matters where depths of sands, types of sands and operations on adjoining properties would have a bearing on the problem involved. The source of all questions will be considered as confidential and only initials will be published in connection with the question.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or practices which are improvements.

SODA ASH AS CLEANER

Would you recommend the use of soda ash for cleaning off the walls of an oil sand?—S. W. M.

In general it would be dangerous to resort to the practice suggested in your inquiry. There might be formed at the face of the sand insoluble salts which it would be more difficult to remove than the substance which you had attempted to remove with the soda ash. If you wish to remove paraffin from the sand, the electric heater method is recommended. By this method the heater is left in the hole for several days and the face of the sand is heated till it is above the congealing point. Then while the sand is still warm pumping is resumed, thus preventing the paraffin from settling on the face of the sand again while the temperature is becoming lower. You will find of interest in this connection an article in The Oil and Gas Journal for November 3, 1927, describing the use of the electric heater in Wyoming oil fields. If silt, or possibly salts of some kind, have been formed, shooting or washing with fresh water may give satisfactory results. A wash pipe equipped with a spray at the bottom for circulating water has been successfully used. Hot oil also has been used successfully to clean the face of the sand.

REPRESSURING WILCOX SAND

I heard recently that several companies have attempted to repressure the Wilcox sand in the Seminole district. Have you any information on the results of this repressuring?—T. S. F.

Some attempts are being made to repressure the Wilcox sand in the Seminole area, but very little information is available on the subject. It was reported that one company injected gas in one well and temporarily increased the production on an offset well. After producing for some time the offset well suddenly went to water. No oil has been produced from the well since that time.

TIME OF MUD CIRCULATION

Can you give me a method for determining the time required for mud to circulate from the bottom of a well to the top when drilling with rotary?—N. C. P.

As the first step in the process, calculate the capacity of the mud pump for one revolution. This is done by ascertaining the cross-section area of the cylinder in inches and then multiplying the area by the length of the stroke in inches. Multiply this figure by 1, 2, 3 or 4 for single, duplex, triplex or quadruplex single-acting pumps, and by 2, 4 or 6 for double-acting pumps. Divide this figure by 231 in order to obtain the pump capacity in gallons for one revolution. To obtain the pump capacity in gallons for one minute, multiply the pump capacity for one revolution by the number of revolutions the pump makes per minute. Calculate the cross section area between the drill pipe and the wall of the well or casing and determine the volume for 1 foot in gallons. Multiply the volume in gallons per foot by the depth of the well in feet, thus arriving at the total volume of fluid necessary to displace before the returns arrive at the surface. Divide this figure by the pump capacity in gallons per minute and the time required for the mud to travel from the bottom of the well to the surface is obtained in minutes. Tables are now available giving the capacity of horizontal pumps for lengths of stroke ranging from 4 inches up to 24 inches. These may be obtained by writing to the United States Bureau of Mines station at Bartlesville.

REDUCING EMULSION

I recently brought in a flowing oil well that made considerable water and about 12 per cent emulsion. Am holding about 75 pounds of back pressure on the well by pinching in on a gate valve at the well head. By holding pressure on the well, the amount of free water was reduced, but the emulsion increased to 16 per cent. Is there any way in which the amount of emulsion can be reduced?—R. P. C.

The most satisfactory measure and one which gives the most lasting results, would be to shut off the water if at all possible, as any other method usually offers only temporary relief. As the rock pressure declines the water will increase in volume. Furthermore, there is always danger of damage to neighboring wells. However, there are occasions when the water can not be successfully excluded from the well, in which event one of several methods may be used to reduce the amount of cut oil to a minimum.

Often the cutting of oil in the presence of water takes place at the well head, this being caused by restrictions, irregularities and changes in direction of flow. This difficulty may be partly overcome by eliminating as many bends in the line as possible. Flow nipples are preferable to gate valves to hold pressure at the well head. Emulsification may take place at the casing shoe also when the oil and water enter the well. One method used both to reduce the volume of water and decrease the amount of emulsion is to hold pressure on the oil and gas separator rather than at the well head.

Another method is to flow the well directly into an oil and water separator consisting of several lengths of either 8-inch or 10-inch casing, pressure being held at the discharge end of the separator. The latter method was described in one of the California State Mining Bureau monthly publications, a copy of which may be obtained by writing to the San Francisco or Los Angeles office of the bureau. You might also obtain the information by writing to the Associated Oil Co. at Ventura, Calif.

GAS LIFT FOR SAND TROUBLES

Am having sand troubles in pumping wells. Do you think that this could be overcome by using the gas lift, also would it be possible to increase the oil production of these wells by the gas lift?—W. H. F.

Not knowing the fluid level and the depths of your wells, your question is rather difficult to answer. With a sufficiently high fluid level, the gas lift may be used to advantage in producing wells such as you describe. This does not mean that the sand will not come into the hole, but rather that it is easier to remove it with the gas lift than by pumping. With low fluid levels, unless a flow chamber is installed in the well in order to relieve pressure on the sand, and the wells are flowed intermittently, the use of the gas lift is not recommended.

Running the pump barrel low in the well and removing as much sand as possible rather than attempting to prevent its entering the hole often gives good results. It may require several weeks or months to obtain satisfactory results, but it generally pays in the long run.

As regards the likelihood of increasing production by means of the gas lift, it is possible that production may be increased for two reasons unless the well is pumped off. Sand in the bottom of the well may be preventing oil from entering, also some time is lost in pulling rods and possibly tubing. Using the gas lift will result in eliminating shutdowns. Under normal conditions, and provided the pump removes the oil as rapidly as it enters the well, no increase in production need be expected from the gas lift.

DETERMINING HORSEPOWER

How does one determine the horsepower required for an engine or motor to be used for pumping oil through a pipe line?—A. R. P.

It is necessary first to know the amount of oil to be pumped, the pressure that will be developed and the mechanical efficiency of the pump. The pressure will have to be determined by hydraulic formulas. With this information the following formula can be used to determine the horsepower:

$$\text{H.P.} = \frac{.0004083 \times \text{BP}}{\text{Efficiency of Pump}}$$

where B = barrels per hour,
P = pressure pounds per sq. in.

Example—What is the horsepower required to pump 1,000 bbls. of oil per hour against a pressure of 600 pounds per square inch? Efficiency of pump 86 per cent.

$$\text{H.P.} = \frac{.0004083 \times 600 \times 1{,}000}{.86}$$

$$= 285 \text{ approximately.}$$

RATE OF OIL'S ENTRANCE INTO WELL

How do you find out the rate at which oil will enter a well?—H. H. V.

A device for measuring the fluid level in a well has been devised by Professor Uren of the University of California. It is described in the American Institute of Mining and Metallurgical Engineers transactions for 1925. Other electrical devices have been used successfully for this purpose. Determining the fluid level with a bailer has been the common practice. The usual procedure is to lower the fluid level as much as possible and then to determine the fluid level at stated intervals. The rate at which the fluid enters the well with the oil at different levels in the well can thus be ascertained. Surging of the fluid often makes it difficult to determine the actual fluid level.

MAKING A GAS WELL GO TO OIL

I drilled a well into an oil sand, but the well came in making only gas. The well was blown wide open for about 10 days to lower the sand pressure and to allow the oil to come in, but the well is still making only gas. Wells two locations away are averaging 225 bbls. a day. Can you tell me any way in which the well may be regulated in that it will go to oil?

The method used by you in attempting to make an oil well out of a gas well is the one that is usually employed. It is an extremely wasteful method and if at all possible its practice should be discontinued. It is generally recognized that any method whereby the pressure in an oil sand is dissipated unnecessarily should not be used. In event that you own offset acreage, it is suggested that the well be shut in entirely. Another suggestion is offered as a possible solution, namely, if the well is not already equipped with tubing, run in a string of 2-inch tubing with the bottom of it just above the top of the sand. Then hold an appreciable amount of back pressure on the tubing, keeping the well closed in between the tubing and casing. Not knowing the rock pressure, it is impossible to state any definite amount. Roughly, a pressure equivalent to about one-half the rock pressure may be held to advantage in some cases to bring the oil into the well. It depends on the lateral extent of the gas area as to whether the well can be converted into an oil well.

CASING OFF GAS SAND

If gas overlies the oil in an oil sand would you advise casing off the part of the sand containing only gas?—B. H. P.

If there is a break between the gas horizon and the oil horizon, by all means land the casing below the gas even if the break is not continuous. Where there is no break in the sand, the results are likely not to be so satisfactory as there is a likelihood of the gas by-passing down around the shoe of the casing. In any event it is suggested that you do not produce the well wide open in order to reduce the gas volume in the sand as the oil will then migrate into the gas horizon and at least a portion of it will never be recovered.

MEASURING WITH PITOT TUBE

I have been taking measurements on gas from a separator with a Pitot tube. Would these measurements be accurate?—O. S. B.

Pitot tube measurements if properly made are accurate to within possibly 5 per cent, and compare favorably with other methods in so far as the measurements of that particular interval are concerned. On account of variations in the volume of gas which may occur during a 24-hour period a recording orifice furnishes more accurate measurements. Another method that has been used successfully to take intermittent readings is to install an orifice disk in the gas line leading from the separator and to measure the differential pressure across the orifice plate with a manometer. This method has been used successfully on repressuring properties for determining the quantity of gas being injected into a key well. A portable meter costing approximately $40 was used to measure the differential pressure. It is always well to take the measurements regardless of method, at the end of a straight run of sufficient length.

The Highest Form of Reliable Safety Insurance When Running-In

The BAKER McLAINE FLOAT PLUG COMBINATION

Screw Type and Slip Type

Screw Type Patented

Slip Type Patented.

Baker-McLaine Float Plug

Safety, facility of operation and the preservation of well equipment are attained to the maximum degree where the Baker-McLaine Float Plug is used, especially in combination with a Baker Plain Casing Shoe. It consists of a cast iron shoe guide, especially designed for use in rotary holes, and a cast iron back-pressure valve having a ½-in. round soft stem and spring, all of which are easily drilled up.

Reliable Safety Insurance

The guide itself is a reliable safety measure in that it will guide the casing past any irregularities in the well, having a tendency to plaster the walls of the hole. It will not hang up. Its outstanding advantage is its ability to safely float in the longest and heaviest strings of casing, eliminating the danger of parting and expensive fishing jobs.

The cost of this reliable safety device is only a very small fraction of the cost of a string of casing, to say nothing of the cost of bringing the well to the point where casing is run in. The deeper the hole, the greater the investment, and the cost of protecting this valuable investment is proportionately lower.

Write for folder giving complete description and instructions for using when running casing and cementing.

BAKER CASING SHOE COMPANY

COALINGA, CALIFORNIA — TAFT, CALIFORNIA

Box L, Huntington Park, California

Export Sales Office:
25 Broadway, New York City

Mid-Continent Representatives:
B & A SPECIALTY COMPANY

220 E. Brady St.
Tulsa, Okla.

708 Keystone Bldg.
Houston, Texas

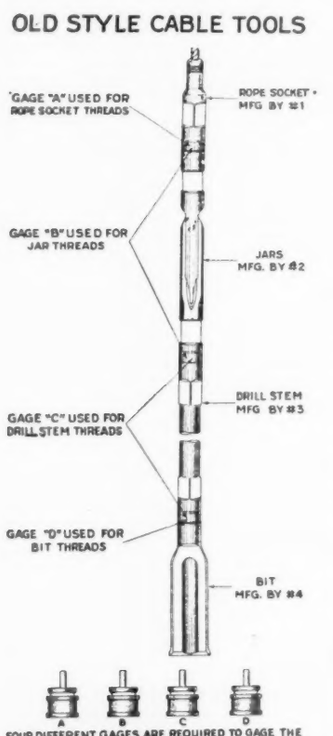
Results of Usage of A.P.I. Taper Joints

Simplification and Interchangeability Notable Advantages. Trouble From Intermingling of Tools Avoided

By R. A. Wilson*
The Guiberson Corporation.

Representing as I do a manufacturer of both rotary and cable tool special equipment, some of the data collected has possibly more significance to me than to a casual operator. However, every operator cannot but be impressed by the tremendous advantages accruing to both manufacturer and operator alike when the work of the two A.P.I. committees responsible for these specifications is carefully reviewed.

The first significant fact is the tremendous amount of work in simplification that has been done. Without attempting to review the vast amount of technical and practical research necessary to complete the work, let us analyze what has been accomplished in the elimination of unnecessary sizes.


OLD STYLE CABLE TOOLS
"GAGE "A" USED FOR ROPE SOCKET THREADS
ROPE SOCKET MFG. BY #1
GAGE "B" USED FOR JAR THREADS
JARS MFG. BY #2
GAGE "C" USED FOR DRILL STEM THREADS
DRILL STEM MFG. BY #3
GAGE "D" USED FOR BIT THREADS
BIT MFG. BY #4
A
B
C
D
FOUR DIFFERENT GAGES ARE REQUIRED TO GAGE THE THREADS ON FOUR SEPARATE ITEMS EACH ITEM BEING MADE BY DIFFERENT AND WIDELY SEPARATE MANUFACTURE WITH NO ASSURANCE THAT THE PARTS WILL FIT ACCURATELY OR BE IN PERFECT ALIGNMENT
SLIDE 8

It is well known that regardless of what kind of taper joint is used by any manufacturer some sort of gauge or sample was necessary if any degree of interchangeability of that joint was to be maintained. This practice resulted in some of the manufacturers collecting veritable museums of gauges and samples.

It must have required a librarian to catalog them all. Again try and visualize what it must have meant to these manufacturers to schedule orders throughout their shops with such an assortment of sizes and shapes. Is it any wonder that mistakes, costly mistakes, were bound to happen? I do not mean to reflect on the workmanship of any of these manufacturers either in the gauges they have made or in their product produced from these gauges, but when the ramifications of warehouse stocks, deliveries, errors in understanding orders are visualized, it is easy to understand the confusion that must have sometimes existed.

Let us now turn to a brighter picture. This shows the A.P.I. master gauges for cable drilling tool joints. What a relief! Only one size gauge and point for a certain size string of tools, whether for California, Wyoming or anywhere in the oil fields. There is no chance for any mistake—the buyer and the manufacturer are speaking the same language.

The foregoing summary may serve to show the results of simplification accomplished on cable drilling tool joints. It should be said here that 52 manufacturers and oil companies have purchased master gauges for cable drilling tool joints.

Let us now turn to the situation that prevails on rotary drilling taper joints in which a similar condition exists. The various sizes of gauges used by a prominent western manufacturer numbered 59 in all.

Investigations of the committee showe l that in the South Texas district alone there were 28 different sizes of taper joints used for 4-inch drill pipe. Taking the country as a whole, I believe it is a fair statement to make that there were in excess of 100 sizes of taper joints used for rotary drilling with the resulting confusion to the operator and manufacturer pointed out above.

Let us again turn to the brighter part of this picture in which we have seven sizes of taper joint gauges for rotary drilling adopted by the institute as standard. These gauges are not yet available to the trade as the group order is now in the process of manufacture in the East with a large gauge manufacturer. It is gratifying to report, however, that practically every manufacturer of rotary tools of consequence in this country is included in this group order, a total of 35.

I have included in this review the situation as it appears to me in this country but the picture would not be complete without pointing out the distribution of A.P. I. gauges among the foreign fields. Practically all the principal foreign manufacturers of tools have also purchased gauges. The significance of this fact is that A.P.I. standards are not only confined to this country but they are international and are being introduced throughout the world wherever oil is found.

Practical Advantages

Let us now endeavor to visualize the effect of this standardization work. Slide No. 8 illustrates a string of cable drilling tools made by different manufacturers under the old system which graphically illustrates the inconvenience of improperly mated joints. Of course, if all the tools are made by one manufacturer, it is to be assumed that they will properly go together. This picture is based on the assumption that the different tools have been purchased from different manufacturers as is often necessary in rush periods. Slide No. 9 illustrates the same string of tools made by different manufacturers with A.P.I. standard joints, properly mated and screwed together ready for service.

From the larger operators' viewpoint standardization of taper joints is accomplishing many other advantages.

There is no large operator today but is faced occasionally with the necessity of moving tools from one lease to another or even from one district to another. How frequent have been the troubles caused by this intermingling of tools purchased under different specifications, due either to difference of ideas of different superintendents or due to the fact that many and various small producing or drilling properties have been purchased by a larger company. What a series of misfits are thus accumulated! Field machine shops to cope with this situation must have all makes of gauges to make one tool fit another or the entire collection of misfits must all be turned to fit the standards used on the property to which they are moved. With A.P.I. standards adopted, tools may be moved from Pennsylvania to California or Texas to Wyoming and be fitted into their new companions without delay or machine shop expense. Equipment will never become obsolete for the reason that joints will not fit. Inventories will be reduced and tools will be worn out to the economic limit.

To those of you in the oil business, and I know there are many present who have had practical experience in the field, it is not necessary for me to dwell on the number of times you have been delayed or had serious fishing jobs due to improperly mating joints or due to your inability to secure quickly the tool you needed with the proper size joint.

Commenting generally just for a moment that standardization of this character may or may not have interfered with the private initiative of any particular manufacturer, I should like to mention the following facts:

In the case of the larger manufacturer, it seems to me that he has the advantage of concentrating on a single standard, also he has a further advantage of selling certain parts of his complete equipment to purchasers more flexibly than he could under the old system where his particular type of connection might not interchange with the connection of another manufacturer with which it should operate. It broadens his field of selling without in any way interfering with the design of the tool itself. He can sell his grief stem, swivel, tool joint, drill collar or fish tail bit as the case may be, either as a part or as a unit.

Take the case of the smaller manufacturer in a single field possibly specializing in certain individual tools with his own particular joint. Standardization can increase his sales by making his material suitable for any district, as his taper connection will readily interchange into the complete drilling string.

Maintaining Interchangeability

All of the advantages recited in the foregoing could easily be nullified if means had not been provided so that these gauges owned by the various manufacturers could not be kept to standard. Machinery for this purpose was very wisely recommended in the early stages of the work by the cable drilling tool joint committee. They recommended there should be a set of grand masters deposited with the Bureau of Standards in Washington, D. C., and that regional grand masters should be deposited in the three principal oil-producing districts in the United States in order that manufacturers could check their gauges from time to time and see that they were within the projection limits specified.

Cost of Gauges

It may be of interest to know the amount of money expended to date on gauges. The records of the division of standardization show practically $500,000 has been spent for master and working gauges of all kinds, pipe, taper joints, etc., in the petroleum industry. Of this amount practically $75,000 has been expended for cable tool joint master gauges and in excess of $50,000 more will possibly be spent for rotary drilling taper joint gauges. In addition to this a similar amount is necessary for the working gauges in the shops, so therefore, it is safe to say that practically $250,000 has been or is being expended by manufacturers and operators alike for master and working gauges to make these taper joint standards effective throughout the industry.

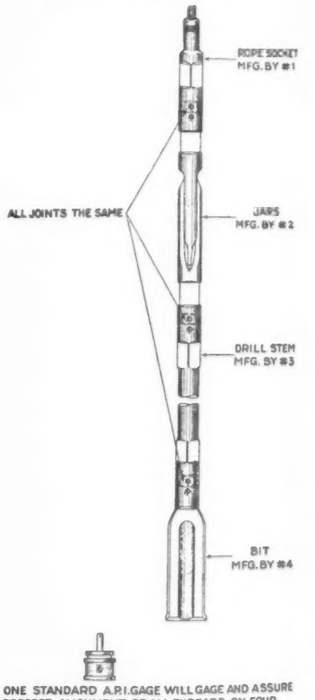
Actual Results

What has actually been accomplished to date in getting these standards into general use? I quote below from some of the letters recently received by Mr. Pew in response to his recent general circular about extending the use of the A.P.I. standards. The following is from a large oil company in the Wyoming district:

"We have changed most of our drilling tool joints to A. P. I. and will recommend to the management that they change other material over to the A.P.I. as soon as possible. I think it will be a wonderful thing when all the operators have changed over to A.P.I. material. All the changes we have made to date have been very satisfactory."

Here is another from the Wyoming district:

"It may be of interest to you to know that in the Rocky Mountain division we have changed the greater part of the cable tool joints to A. P. I. standards, and we are changing over all of our equipment as fast as it is practical to do so. All of our cable tools now in use in the Big Horn Basin carry A.P.I. joints."


A.P.I. CABLE TOOLS
ROPE SOCKET MFG. BY #1
ALL JOINTS THE SAME
JARS MFG. BY #2
DRILL STEM MFG. BY #3
BIT MFG. BY #4
A
ONE STANDARD A.P.I. GAGE WILL GAGE AND ASSURE PERFECT ALIGNMENT OF ALL THREADS ON FOUR SEPARATE ITEMS, EACH ITEM BEING MADE BY DIFFERENT AND WIDELY SEPARATE MANUFACTURE.
SLIDE 9

The following is from a large operator in California:

"Where we use cable tools we use the A.P.I. taper joints."

Here is another from a large operator in Wyoming:

"We have standardized 100 per cent on A.P.I. drilling tool joints both on

(Continued on Page 109)

*Before American Petroleum Institute, Chicago.

The Longest natural gasoline pipe line in the WEST
100 MILES of 4-inch and 6-inch
American Seamless Slip-Joint Line Pipe
The 100-mile natural gasoline transmission line, built by the Shell Company of California and extending from its plant in Ventura, California, to the refinery at Wilmington, is a significant tribute to American Seamless Slip-Joint Line Pipe.
The line consists of 85 miles of 4-inch pipe, the balance being 6-inch. Joints average 40-feet in length, giving an economical welding total. The lightness of the pipe facilitated speedy handling throughout. No difficulty was experienced in welding the high carbon steel.
Two mountain ranges were crossed with this line: one at Santa Susana Pass, elevation 1,650 feet; and the Santa Monica Mountains, elevation 1,300 feet. Some idea of the difficulties encountered may be gained by reference to the illustrations, and the profile of the line, reproduced here.
AMERICAN SEAMLESS TUBE CORP. OF CALIFORNIA
PETROLEUM SECURITIES BUILDING
LOS ANGELES, CALIFORNIA
535 Fifth Ave. New York City
1211 Neils Esperson Bldg. Houston, Texas
When this Line Was Built the Best Pipe Was Essential

Shell Oil's new 100 mile gasoline pipe line insures against corrosion

30 MILE SECTION IN WORST SOIL PROTECTED WITH BITURINE ENAMEL

From Ventura, California, to the refinery at Wilmington—nearly 100 miles—runs the Shell Oil Company's new natural gasoline pipe line. Laid in a variety of soils, some highly corrosive, it is significant to note that the 30 mile section laid in the worst soil was protected with Biturine Enamel—the permanent corrosion preventive.

Biturine Enamel prevents corrosion permanently

For over sixteen years leading oil and gas industry executives have been putting their pipe line corrosion problems squarely up to Biturine Enamel. In all cases it has given permanent protection.

Impervious to acids, alkalis, electrolysis

Biturine Enamel is a heavy quick-setting bituminous coating, tough but not brittle. Applied hot it is a complete coating, requiring no wrapping. Impervious to corrosive elements in the soil.

Biturine Enamel is but one of a special line of paints and coatings manufactured by Hill, Hubbell & Company for the oil industry.

Biturine Enamel is supplied with directions. No skilled labor is necessary to apply it. Valuable, practical data and specifications on request.

HILL, HUBBELL & COMPANY

Manufacturers of

Highest Grade Oil Industry Paints and Pipe Line Coatings

Factories at SAN FRANCISCO and TULSA

District Offices

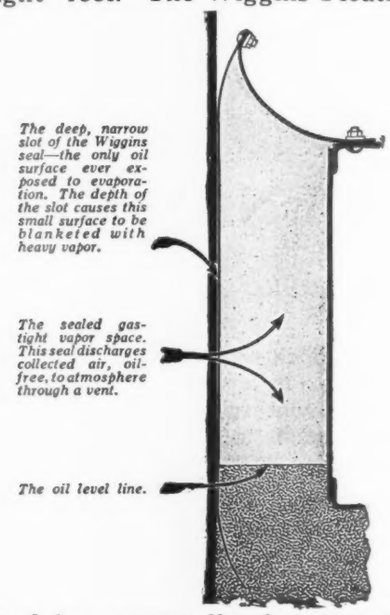
LOS ANGELES HOUSTON SEATTLE
NEW YORK CITY PORTLAND BALTIMORE

Can an Oil tank roof be made Gas-Tight?

ONE sure way to stop evaporation would be to store oil under roofs that are literally "gas-tight." If no gas can escape, obviously no evaporation loss is possible. Cone roofs could be built to stand the necessary internal pressure and absolutely "gas-tight"—but only at excessive cost. Ordinary "gas-tight" roofs are equipped with vents which permit vapor to escape when its volume increases. Naturally this happens with every rise in temperature. Such a roof, therefore, is really not "gas-tight" at all and permits considerable evaporation loss. Can a roof be made "gas-tight" at reasonable cost?

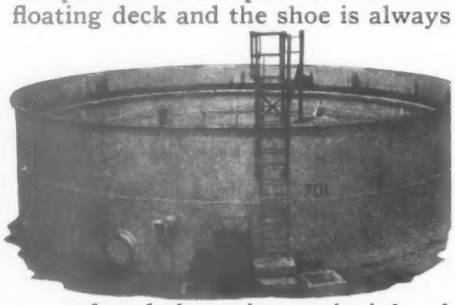
Making the Wiggins Roof "gas-tight"

Wiggins Roofs offer a close approximation to the theoretically "gas-tight" roof. The Wiggins Floating


The deep, narrow slot of the Wiggins seal—the only oil surface ever exposed to evaporation. The depth of the slot causes this small surface to be blanketed with heavy vapor.
The sealed gas-tight vapor space. This seal discharges collected air, oil-free, to atmosphere through a vent.
The oil level line.

Roof has repeatedly demonstrated its ability to eliminate a large portion of the loss experienced with the best cone-type "gas-tight" roofs. The Wiggins Breather Roof under ideal conditions eliminates all of this loss and in actual practice the extreme conditions that may cause it to fall short of this standard arise only at long intervals and usually last only momentarily.

The big problem in designing a floating roof is to seal the space between the floating deck and the tank shell. The all important feature of the Wiggins Floating Roof is the fact that this sealing is accurately accomplished. The space between the floating deck and the shoe is always



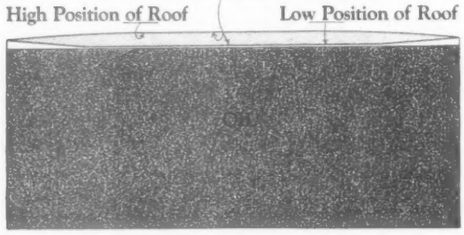
covered and the unique principle of the tall narrow slot between the shoe and the tank shell prevents loss when this space is opened by the shoe passing over a rivet head. The proportions of the slot make it almost impossible for the heavy vapor in contact with the oil to get out. Being heavier than air it remains at the bottom of the slot and there is practically no windage to disturb it.

The Breather Roof—a new "gas-tight" design

The principle of the Wiggins Breather Roof is new in oil tank roofs. For tanks in which oil is stored for considerable periods with relatively small outage, this roof provides ample expansion in the vapor space to meet ordinary temperature changes without permitting any vapor to escape. This expansion is accomplished by the flexing of a steel roof from a slightly convex to a slightly concave position. The increase in space is equivalent to raising the entire roof approximately one foot.

Under normal operating conditions this is truly a "gas-tight" roof. A volume relief valve opens when the increase in vapor volume is greater

Variation in Vapor Space



than the flexing of the roof will accommodate. This occurs only under unusual conditions such as during filling or in passing through a seasonal temperature change from cold weather to hot. A vacuum relief valve likewise protects the roof when emptying the tank.

Evaporation savings outweigh cost of roofs

The savings effected by these practically "gas-tight" roofs far exceed the cost of equipping your tanks. The Wiggins Floating Roof will operate on tanks in any service. But since evaporation loss is greatest in working tanks where filling and emptying losses are added to breather

losses a large majority of the Wiggins Floating Roof installations have been made on working tanks. Experience has shown that on gasoline run-down tanks or similar working tanks handling highly volatile oils the savings with a Wiggins Floating Roof will pay its cost in a few months.

The Wiggins Breather Roof is especially designed for standing storage. Its cost is less than the floating roof and for tanks where the oil is handled only at considerable intervals it serves just as well as the floating type.

These companion roofs offer complete evaporation protection for oil in storage under all conditions. This tremendous waste can be stopped. There is no obligation whatever in asking for estimates from our nearest sales office.

CHICAGO BRIDGE & IRON WORKS

CHICAGO, 2128 Old Colony Bldg.
NEW YORK, 3147 Hudson Terminal Bldg.
CLEVELAND, 2204 Union Trust Bldg.
DALLAS, 1641 Dallas National Bank Bldg.
ATLANTA, 1054 Healey Bldg.
SAN FRANCISCO, 1054 Rialto Bldg.

WIGGINS FLOATING ROOFS *for working storage*
WIGGINS BREATHER ROOFS *for standing storage*

O&GJ 12-8-Gray

Burbank Maintains Its Prominence

Recently Completed Big Well Makes Two Leases Very Attractive. New Angles on an Interesting Area

By James McIntyre

Ten quarter sections in townships in which the Burbank Field lies will be offered at the next Osage sale on Monday, December 12. These are Tract 116, NW Section 2-26-6; Tract 117, SW Section 2-26-6; Tract 118, SE Section 3-26-6; Tract 119, NE Section 10-26-6; Tract 120, NW Section 13-26-6; Tract 121, NE Section 14-27-6; No. 122, SW Section 16-27-6; Tract 123, NW Section 21-27-6; Tract 124, NW Section 27-27-6; Tract 125, NE Section 28-27-6. All but two, Tracts 120 and 121, offset producing acreage. No tracts have been offered immediately west, south or north of the Burbank Field. The tracts of most importance are Nos. 122 and 123, made so by the fact that Oliphant and others recently completed a 5,000-bbl. well in the northeast corner of Section 20-27-6. Tract 122 is just northeast and Tract 123 is directly east of the big well.

A special feature of the coming sale is that the provisions of the present regulations requiring the drilling of a well within 12 months from the date of approval of the lease are suspended as to this particular sale and lessees acquiring tracts may hold them for the full five-year period without drilling, upon payment of a rental at the rate of $1 per acre per year.

Only 20,000 acres of leases will be offered of which 11,040 acres are east of Range 7, and 8,960 acres west of Range 8. One hundred and twenty-five tracts will be put up at auction.

The Oliphant well in Section 20-27-6 is not the only recent well in the field that attracted special attention. George Parker in the southwest quarter of Section 11-26-6 has a lease on which he first got production late in August. The lease has three wells on it and on November 1 had made a total of 93,772 bbls. in a little over two months. The third well drilled was the best of the three completions. The lease cost Parker $75,000 in bonus at the March sale. It is the most easterly producing property in the field.

The Burbank Field is one of the most interesting producing areas in the oil regions of the United States. It has been a great money maker for some producers and a financial tragedy to others. The first well in the Burbank Field was completed in the northeast quarter of Section 36-27-5, in May, 1920, by the Marland Refining Co. on a quarter section that cost the company $2,000. This lease has since produced 1,712,639 bbls. of oil.

Low-Priced Wildcat Tracts

Previous to the starting of this test, acreage in the Burbank district had been offered at auction sales, and as it was absolutely wildcat it brought only nominal bids and was knocked down to a number of companies which bought it purely as a matter of protection. The Carter Oil Co. thus picked up two leases at $500 each; the Devonian Oil Co. one at $700, the Gypsy Oil Co. one at $900 and another at $1,300, Ike Simons one at $800 and another at $3,100, some one having given Simons some competition on this tract. The Twin State bought a tract for $800. Some of these tracts were bought as far back as the November sale in 1918. In all, 25 tracts were bought at different sales at an average of $2,632 per tract, or an average of $16.45 per acre. These 25 tracts have produced 25,149,165 bbls. of oil at an average bonus price of a shade more than one-quarter of a cent per barrel of gross production.

In contrast to this, the 25 highest-priced tracts cost in bonus $32,131,000 and produced 37,699,084 bbls. of oil. The bonus paid amounts to 85.2 cents per barrel of gross production and the market value of the crude from the beginning until the present was $1.83 per barrel. On this basis the owners of the 25 high-priced tracts received for their oil approximately $56,708,340, and the Indians received about $12,280,830 in royalties. It cost between $28,000 and $30,000 to drill a well in the Burbank Field and the cost of the 396 wells on the 25 highest-priced tracts was somewhere around $11,500,000. This sum, added to the $32,131,000 paid in bonus and the cost of operating the producing properties, did not leave the operators a large margin of profit on such a vast outlay of capital. In other words, the Indians got $44,411,830 in bonuses and royalties and the producer got $13,077,340 after deducting bonus, and drilling expenses but not deducting the cost of administering and operating the 25 properties over a period of years. The Indians did not create the wealth, nor did they even discover it or develop it. They merely looked on and collected.

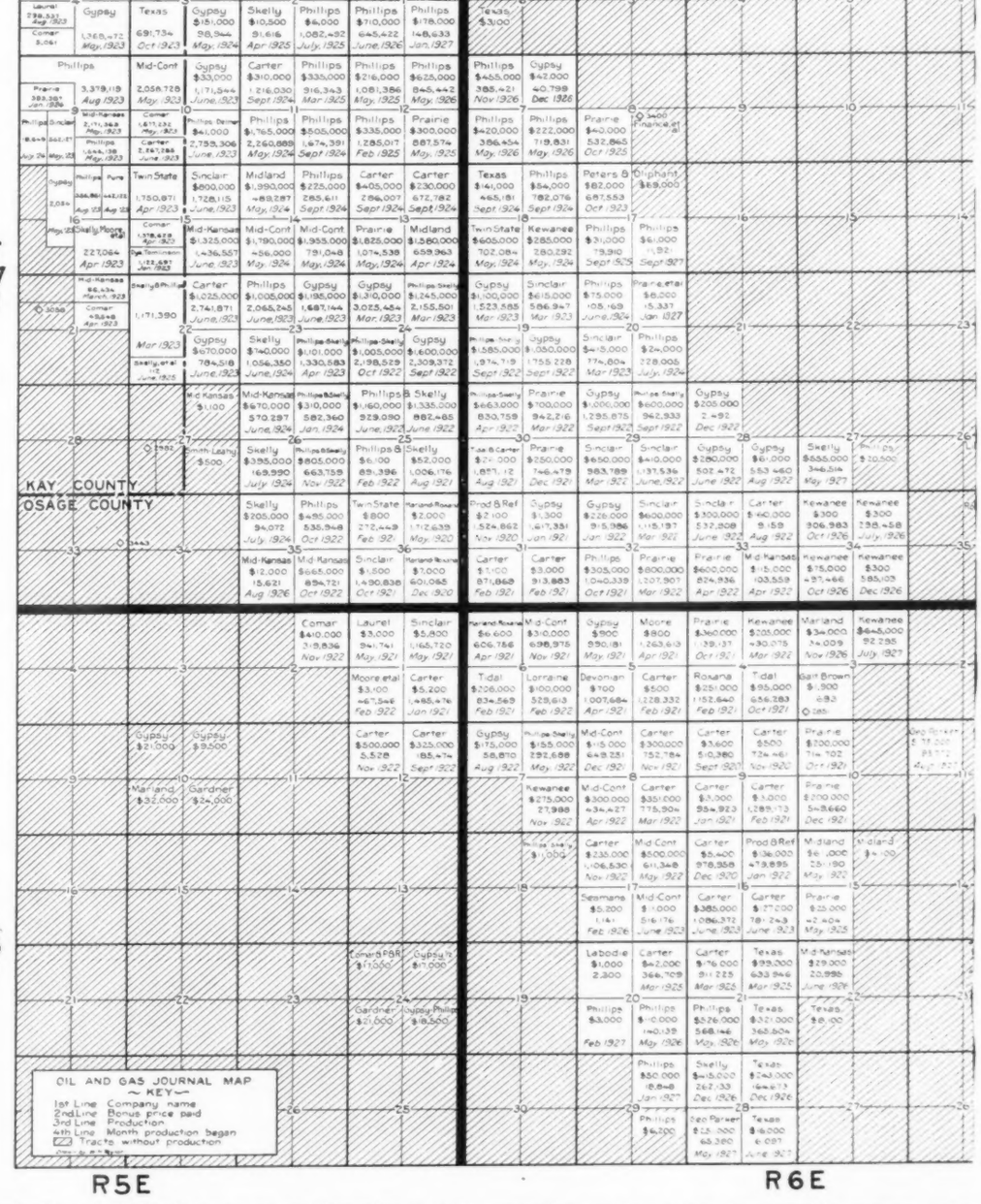
However, when we turn back to the leases that were bought at prices ranging from $300 to $6,000, a brighter picture is presented. The operators who developed these leases "cleaned up" nobly. They received for their oil about $37,800,000 more than they paid in bonuses. One of the leases of the Carter Oil Co., which cost $300, has yielded 1,228,332 bbls. gross, and 11 of the 25 leases yielded over 1,000,000 bbls. each. Ike Simons paid $800 for a tract which has produced 1,263,063 bbls. in which Simons, who took in some partners, retained a very considerable interest.

Taken as a whole, Burbank will pay back generously. Not only is the oil of high grade, 37 degrees and above, but it is rich in casinghead gasoline in the manufacture of which a large and flourishing business is maintained in the field.

Indians' Bonus Harvest

The Osage Indians have received a total of $61,217,200 for Burbank tracts, some of which have not yet been drilled.

(Continued on Page 164)



Production of Burbank tracts up to November 1, 1927, according to data taken from weekly reports from the field since its beginning in May, 1920.

10 months' service in one well—best previous record for other tubing 62 days.

125 days in another well and still in excellent condition. Best previous record in same well for other tubing 90 days.

Authentic service records are now convincing most skeptical operators. Write now for further facts about the astonishing performance of Byers Galvanized Tubing under severe corrosive conditions.

A. M. Byers Co.
Established 1864 ~ Pittsburgh, Pa.

BYERS PIPE
GENUINE WROUGHT IRON

CENTRAL WEST FIELDS

(Continued from Page 58)

reported drilling near Gentryville, in the northwestern part of Spencer County.

In Center Township, Gibson County, Joe S. Young, Jr., and others' test in the southwest corner of the E. Carrithers farm, NE Section 2, came in a dry hole at 606 feet.

In Delaware Township, Delaware County, the Athens Gas Corp. and others abandoned Nos. 1, 2 and 3 on the D. Michaels farm, and Nos. 1 and 2 on the C. M. McNally farm, Section 15.

The Waterloo Oil & Gas Co.'s No. 7 on the C. E. Brinkerhoff farm, Section 21, Bear Creek Township, Jay County, showed an initial production of 20 bbls., with No. 8 well starting. In Penn Township, Say and others are drilling No. 1 on the H. Heller farm, Section 27. In Knox Township, the Knox Oil Co. found a dry hole at a test on the Earl Kessler farm, Section 16.

In the Keystone Field, in Chester Township, Wells County, the Lawrenceville Drilling Co. drilled a dry hole at a test on the Bertha Twibell farm, Section 18.

There are still great prospects of Trenton Rock oil in many parts of Indiana and thousands upon thousands of acres are being taken under lease in the north half of the state, not alone in the old defined field where there are plenty of undrilled locations but far in advance of this old region. The writer just returned from an auto trip over the north half of the state, having visited spots where wells were drilled more than 30 years ago, many yet producing, while others are standing open with no tubing or casing head to be seen, still the holes are full of oil.

Illinois

A test drilled by the Porterville Oil Co., 200 feet from the south line and 600 feet from the west line of the Emma Price farm, in SW Section 25, Prairie Township, Crawford County, Illinois, came in with an initial of 20 bbls. from a depth of 1,048 feet. While this well is not large, it indicates a slight extension to the older producing area and with a little better price for crude will be well worth the drilling. C. E. Watson and others' No. 9 well, 600 feet from the south line and 2,640 feet from the east and west lines of the A. E. Joseph farm, in the SW of Section 23, pumped an initial of 5 bbls. from a depth of 869 feet. In Montgomery Township, same county, John Phipps is drilling a test on one of the J. D. Reaville farms, Section 32. In Licking Township, M. E. Harris and others are drilling No. 6 on the S. Randolph farm, Section 11. In Lamotte Township, same county, the Frog Pond Oil Co. is putting down a test on the C. H. Apple farm, Section 20.

In Johnson Township, Clark County, W. C. McBride, Inc., is drilling No. 1 on the E. McFarland farm, Section 1. In Union Township, Cumberland County, the Ohio Oil Co. is drilling No. 31 on the S. S. Yanaway farm, Section 11, and in the Siggins Pool, northwest from Casey.

The Ohio Oil Co.'s No. 39 well, 620 feet from the south line and 200 feet from the west line of the Smith-Neely farm, in SW Section 2, Denison Township, Lawrence County, got its oil in the Bridgeport sand at 960 feet and went to a total depth of 1,001 feet, the well producing 35 bbls. after given an 80-quart shot. This company is drilling No. 3 on the Sarah E. Grayson farm, Section 20, and No. 9 on the P. S. VanWay farm, Section 31, same township.

In Wabash Township, Wabash County, Toomey and others' No. 15 well, 300 feet from the north line and 1,200 feet from the east line of the Lucy Courter farm, in NW Section 3, pumped an initial of 30 bbls. Sand was topped at 1,462 feet and drilled 60 feet in. Dewees and others' No. 1 on the C. D. Banks farm, Section 6, came in a duster. Foreman and others are drilling No. 1 on the S. E. Pritchett farm, Section 3, and the Adams Corner Oil Co. is drilling No. 13 on the M. Madden farm, Section 6. Breen Oil Co. is starting No. 3 on the L. G. Stillwell, Section 2, and C. E. Bothwell is starting No. 5 on the Jesse Cisil, Section 2.

In Friendsville Township, Wabash County, Smith and others are drilling No. 1 on the J. W. Andrews farm, Section 5. Risley and others are drilling a test on the George Couch farm, Section 1, and Joseph S. Young and others are drilling a second test on the O. A. Price, Section 19, while Miller & Karns have a rig ready to start a test on the C. R. Schrader farm, Section 12.

Central Ohio

Few completions were recorded in the Central Ohio Field the past several days. The Ruff-Stewart Oil Co. drilled a test on the James C. Grove farm, Section 11, Rush Creek Township, Fairfield County, getting a 500,000-foot gas well and starting a second well on the Graffis heirs farm, same section.

In Chatham Township, Medina County, the E. R. Edson & Son Co.'s No. 36 on the W. P. Wertz farm, Lot 5, Section 14, and showing for 2 bbls., while No. 37 is a dry hole. McBrath & Johnson drilled a well on the L. A. and S. E. Brinker farm, Lot 7, Section 10, showing for 2 bbls.

The Federal Oil & Gas Co. of Akron, Ohio, has closed negotiations with Anson Henry Russell of Cleveland, Ohio, transferring to him about 600 acres of oil and gas lease located in Monroe Township, Guernsey County, Ohio, on which there are 12 producing oil wells producing from the top Berea sand. These wells have been producing oil for about 10 years and are still producing an average of 15 bbls. per day. Russell has moved in a drilling machine and is now drilling a well on the Shelley-Gray lease in the center of the north line of the lease in Section 9, for the purpose of testing the deep Berea from which the big gas wells are producing near the town of Birmingham, about 2½ miles southeast of the federal property. If the second Berea is found to be productive all the other wells on the federal property will be deepened by Russell to the second Berea. It looks as though this district will develop into a second Berea gas country and the possibilities are that some oil will be found in this second Berea. At any rate it looks promising.

Michigan

Development work in the Saginaw Field is quieter than at any period during the past year or so, due in the main to the closeness of winter and as operators feel like letting up and paying more attention to pumping wells and getting what oil is possible, in hopes of getting out first cost. Drilling operations are expensive in the field owing to the depth in which the oil is found, the first pay sand being below 1,800 feet, the second pay sand at around 2,300 feet and the third at around 3,000 feet. Poor results have been obtained in the two lower sands which are the Saginaw and Dundee, the best production coming from the first sand which is the Berea.

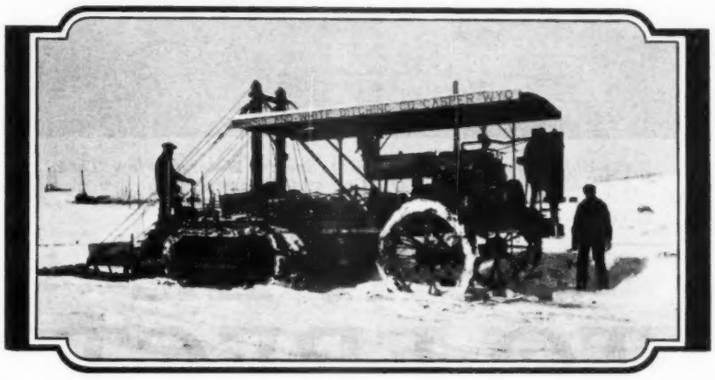
The Sun Oil Co. struck the Saginaw sand in its No. 4 on the Kuck farm, Section 10, Saginaw Township, Saginaw County, and at the northwestern edge of the field at about 2,333 feet and failed to find a pay at 5 feet in the sand at 2,338 feet and shut down, but will drill some deeper. The Schwink Oil Co.'s well No. 4 on the Schwink Packing House property, in the city, is rated as good for 20 bbls. initial from the Berea sand.

Wildcat Duster

The second test of the Wert Oil & Gas Co., on the A. D. Vought farm, about 3 miles south of Decatur, in Van Buren County, in the southwestern portion of Michigan, failed to find a pay sand at the depth of the first well which struck top of sand at 970 feet and got oil at 7 feet in and shot with 60 quarts, is estimated at 5 bbls. Instead the second venture went to a total of around 1,107 feet, or 130 feet deeper than the first test, and got a heavy dose of salt water and the well is being abandoned. This is in an area in which geologists were almost certain that commercial production would be found. These two tests are to the northwest of Cassopolis and

SIX YEARS OLD

~as good as new after digging 250 miles of ditch



DOES oil-field equipment improve with age? Buckeye pipe-line ditchers do, according to R. W. Harris of the Harris-White Ditching Co., Amarillo, Texas.

Long practical experience qualifies these well-known contractors to be capable judges. They own two Buckeyes—one purchased early this year, the other six years ago. Both have been strenuously used.

"Excellent," was their reply when asked the kind of service their youngest Buckeye was giving. "Digging in shaley country, it averages 1000 lineal feet of trench 18 inches wide by 7 feet deep in 8 hours."

Enthusiastic over this performance, they were even more so over the service record of their rugged old Buckeye, veteran of many years' heavy duty in all kinds of soil and in all sorts of weather.

Here's exactly how they express it: "This Buckeye is now working on a job in Wyoming, averaging a mile a day in a 12-hour day. It is in as good shape, if not better, than the day it dug its first foot of trench. During the course of its time, it has dug better than 250 miles of ditch."

Buckeyes have the in-built habit of doing the unusual. The fact that more of them are used for pipe-line trench excavation than all other makes combined, proves positively that the petroleum industry considers them standard oil-field equipment.

The Buckeye Traction Ditcher Co.
Findlay, Ohio

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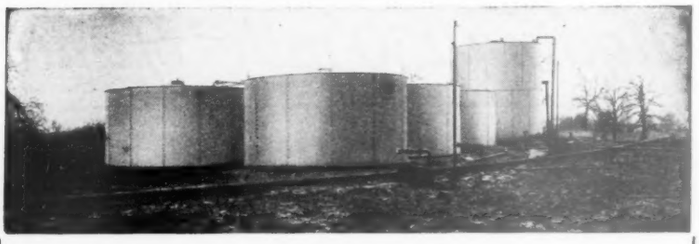
Buckeye TRENCH EXCAVATORS FOR OVER 30 YEARS

KEYSTONE COPPER STEEL



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Exclusive features of design, and our precision methods of manufacture, render MALONEY tanks remarkably simple to erect, or to take down and reset. Our patented "crimp" at seams and joints provides an offset which insures accurate fit of parts without calking. Bolt holes are placed with absolute accuracy, obviating delays and annoyance.

MALONEY material is durable Keystone Copper Steel. Our special rubber packing and our Gaso cement make all seams vapor-tight. Seams are reinforced with rigid steel channels. Special 90,000-lb. bolts—35% stronger than bolts formerly used—are furnished with all tanks. Large cleaning out plates are flush with bottoms. Tanks are painted with Maloney Special Pearl Gray Paint. Valve and deck equipment is the best obtainable.

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Sizes: 12 to 10,000 Barrels

Packed in Steel-Bound Crates for Export

Howell Aluminum "3-in-1" Vacuum Pressure Valve and Thief-Hatch—The BEST and LATEST Deck Equipment—POSITIVE Safety.

MADE OF KEYSTONE COPPER STEEL

MALONEY PATENTED BOLTED COPPER-STEEL TANKS

MADE OF KEYSTONE COPPER STEEL

MALONEY
ALONE!

northeast of Niles in Cass County, where a test was drilled close to 25 years ago, while to the northeast of the Decatur well and north of Van Buren County, lies Allegany County, where some 30 years or so ago a well was drilled that was credited with 15 bbls.

Northeastern Ohio

There is new interest being shown in northeastern Ohio. Considerable acreage has been leased by the Jupiter Oil Co., the Ohio Fuel Gas Co., the East Ohio Gas Co., John J. Eberle & Co. and others in Carroll, Tuscarawas, Harrison and Stark Counties.

The Jupiter Oil Co. has started a well on the 160-acre farm of Daniel Little, in the NW of Section 3, Rose Township, Carroll County, Ohio. This well is being drilled to develop a Lime pool. However, it is to be drilled to the Clinton if nothing is found at a lesser depth. The East Ohio Gas Co. is interested in dry hole money in this well. The Jupiter company has good prospects in the Lime sand, because its drilling well is on a good line from the New Philadelphia Lime Pool in Tuscarawas County, and the Andover Pool in Ashtabula County.

There is to be a deep test drilled in the northern part of Monroe Township, Harrison County, Ohio, by independent parties from Cambridge, Ohio.

The Wittmer Gas Co. of Pittsburgh, Pa., drilled in a nice Clinton lime well, good for 3,500,000 feet, in Stark County. This company's No. 2 well, a mile west of No. 1, is near pay and at 3 feet in the sand a volume of 250,000 feet of gas was encountered and getting stronger as the drill goes down, and they expect a good gas producer. Both of these wells are near Massilon.

CALIFORNIA OIL FIELD OPERATIONS FOR OCTOBER, 1927

According to figures collected by the American Petroleum Institute, Pacific Coast office, the total production of crude oil in California for October amounted to 19,448,893 bbls., an average of 627,384 bbls. per day. This is a decrease of 8,099 bbls. per day under September production.

Total stocks of crude and all products in Pacific Coast territory decreased during the month 932,927 bbls. The total stocks at the end of the month were 140,046,248 bbls. The total stock decrease for 1927, up to October 31, was 5,565,928 bbls.

Sixty-one wells were completed during the month with an initial daily production of 26,101 bbls., compared with 51 wells completed during September with an initial production of 18,559 bbls.

PRODUCTION

(Figures of production and stocks are in barrels of 42 gallons)

District—	Barrels per Month	Daily Average Oct., 1927	Sept., 1927	Oct., 1926
Kern River	610,022	19,678	17,992	12,391
Mount Poso	2,637	85	81	.....
Round Mountain	700	22	.....	.....
McKittrick	152,287	4,922	4,954	5,314
Midway-Sunset	2,560,654	82,602	84,700	93,360
Elk Hills	792,771	25,573	25,987	34,216
Last Hills-Belridge	122,734	3,959	4,015	4,864
Coalinga	592,846	19,124	19,347	19,721
Wheeler Ridge	28,347	914	1,097	1,076
Watsonville	1,782	67	55	58
Santa Maria	181,928	5,869	5,687 *	5,000
Summerland	4,947	131	140	130
Goleta	10,341	334	300	.....
Ventura Avenue	1,712,226	55,233	57,511	50,474
Ventura-Newhall	193,295	6,235	6,072	6,321
Los Angeles-Salt Lake	50,112	1,617	1,672	1,902
Whittier	54,174	1,748	1,739	2,025
Fullerton (Brea Olinda)	525,239	16,943	17,266	22,043
Coyote	435,568	14,051	14,059	16,216
Santa Fe Springs	1,213,434	39,143	39,940	45,981
Montebello	439,628	14,182	14,546	17,428
Richfield	664,416	21,433	22,106	17,410
Huntington Beach	1,940,849	62,608	64,667	54,233
Long Beach	2,906,537	93,759	90,166	95,582
Torrance	641,671	20,699	21,389	26,579
Dominguez	463,736	14,959	15,218	22,013
Rosecrans	241,125	7,778	7,953	14,390
Inglewood	1,012,039	32,646	32,984	41,255
Newport	1,286	41	22	173
Seal Beach	1,891,591	61,019	63,817	1,741
Potrero	571	18	.....	.....
Total	19,448,893	627,384	635,483	611,808
September	19,064,500	635,483		
Decrease	* 384,393	8,099		

*Increase.

STOCKS

	Oct. 31, 1927	Sept. 30, 1927	Oct. Stock Decreases	Oct. 31, 1926
Heavy crude, heavier than 20 degrees A.P.I., including all grades of fuel	93,593,275	93,390,070	*203,205	88,588,410
Refinable crude, 20 degrees A.P.I. and lighter	21,841,747	23,025,124	1,183,377	30,323,321
Gasoline	12,684,662	12,329,195	*355,467	10,614,073
Naphtha distillates	2,351,849	2,672,994	321,145	4,120,222
All other stocks	9,574,715	9,561,792	*12,923	11,340,321
Total all stocks	140,046,248	140,979,175	923,927	144,986,347

DEVELOPMENT

District—	New Rigs Up	Active Drill'g	Comp.	Daily Initial Output	Active Prod'g	Abd. Wells Drlrs.	Abd. Wells Prdrs.
Kern River	10	16	17	3,665	1,328	1	...
Mount Poso	1	3	...	.....	2	...	...
Round Mountain	...	4	...	.....	1	...	...
McKittrick	6	4	2	16	314	...	...
Midway-Sunset	3	4	4	500	2,867	2	2
Elk Hills	...	1	...	.....	219	...	...
Lost Hills-Belridge	...	2	...	.....	245	...	...
Coalinga	...	3	...	.....	974	...	...
Wheeler Ridge	...	2	...	.....	29	...	1
Watsonville	...	...	...	.....	6	...	...
Santa Maria	...	2	1	350	230	...	...
Summerland	...	2	...	.....	92	...	...
Goleta	2	2	1	500	6	1	...
Ventura Avenue	1	27	1	4,725	102	...	...
Ventura-Newhall	2	18	2	245	505	2	...
Los Angeles-Salt Lake	...	...	...	.....	336	...	...
Whittier	...	...	...	.....	183	...	...
Fullerton	1	6	1	335	385	1	...
Coyote	...	4	1	100	209	...	...
Santa Fe Springs	1	2	1	65	322	...	...
Montebello	2	3	...	.....	180	...	...
Richfield	5	12	5	583	255	...	...
Huntington Beach	14	36	10	2,360	592	1	1
Long Beach	32	30	4	9,288	660	...	4
Torrance	1	...	1	50	655	...	...
Dominguez	...	3	...	.....	75	...	...
Rosecrans	2	2	2	358	117	...	1
Inglewood	...	...	2	465	224	...	...
Newport	...	1	...	.....	4	...	...
Seal Beach	1	14	5	1,996	124	2	...
Potrero	...	...	1	500	1	...	...
Miscellaneous drilling	5	129	...	.....	.....	9	...
October	87	332	61	26,101	11,242	19	9
September	60	339	51	18,559	11,254	17	13
Increase	27	*7	10	7,542	8	2	*4
Average for year 1926	95	422	76	32,635	11,288	24	17
Average for year 1925	105	417	79	42,247	11,393	28	12
Average for year 1924	103	510	103	42,412	10,903	28	21
Average for year 1923	111	759	82	114,690	8,928	24	
Average for year 1922	115	605	67	43,700	9,410	17	

*Decrease.

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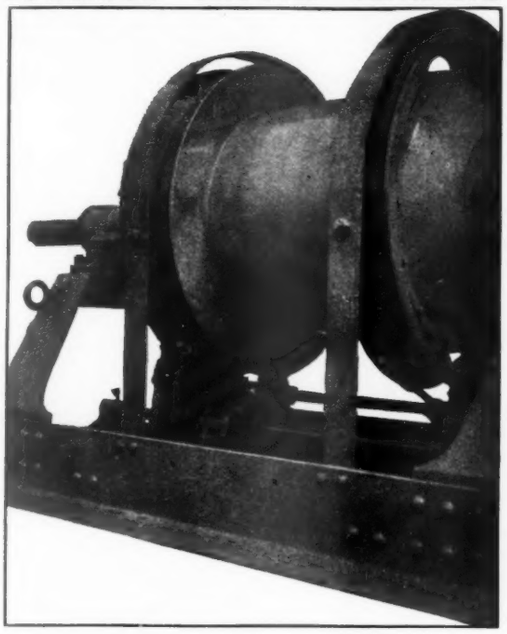

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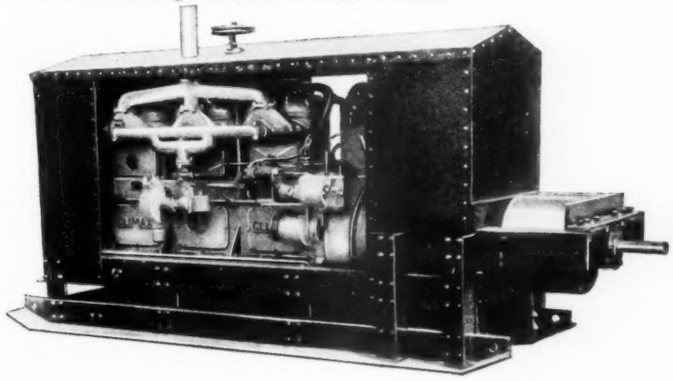
The constant flow of power developed by this 120 h. p. Climax Paymaster, 6 cylinder engine, is transmitted through the new Climax Reverse Clutch to the band wheel. The Paymaster engine gives a very steady and quick accelerating or decelerating flow of power, either forward or reverse direction, through the clutch to the band wheel.



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Reagents for Controlling Corrosion

Aid in Reducing Losses With Atmospheric and Pressure Distillation Equipment at Refineries. Explain Application

By Gustav Egloff and Jacque C. Morrell*
Research Laboratories, Universal Oil Products Co.

One of the most critical and urgent problems in the petroleum industry is the prevention of corrosion, particularly of distillation equipment. The economic losses due to corrosion are high not alone from the cost of replacement, but also from loss of time and curtailed production. The present communication considers the injection of chemicals into refinery equipment in order to neutralize the corrosive substances resulting from the atmospheric and superatmospheric distillation of petroleum oils.

A number of metallurgical methods have also been suggested for controlling corrosion during the pressure distillation of oils of relatively high sulphur content; some of them have gone into commercial use.

1. The manufacture of pressure-still equipment from highly resistant alloys such as chrome iron or chrome steel.

2. Electro plating with such metals as chromium.

3. Lining reaction chambers with chrome iron, aluminum, or other corrosion-resisting metal or alloy.

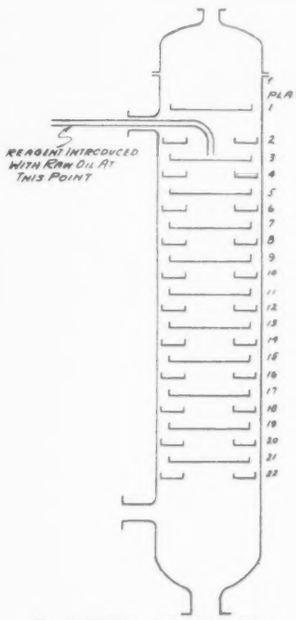
4. Coating the surfaces with a corrosion-resisting metal or alloy by means of welding appliances.

5. Coating the walls of the chamber and dephlegmator with corrosion-resisting elements or alloys by means of spray guns.

6. Using calorized steel surfaces.

7. Lining reaction chambers and dephlegmators with plates of mild steel and replacing them as they corrode.

Another protective measure is the spraying of the inner walls of the various parts of the cracking system, especially the reaction chamber, with a film or layer of corrosion-resisting material which will adhere firmly. Sodium silicate alone or mixed with various materials in suspension, such as lime and furnace cement, have been tested.



No. 1—Design of mixing column.

Reagents Used

Reagents which have been used for minimizing corrosion are sodium hydroxide, ammonium hydroxide, sodium carbonate and hydrated lime. These substances are usually introduced into the system by means of direct-acting pumps. The results obtained indicate that corrosion is reduced over 50 per cent by the use of amounts of chemicals that are relatively small in comparison with the quantities required to neutralize all the corrosive substances.

The chief difference in the use of the various reagents mentioned depends upon the particular application; and while all these reagents neutralize corrosive substances, such as hydrogen chloride and hydrogen sulfide, the choice of the particular reagent depends upon the type of oil undergoing distillation and the method of operation of the equipment. For example, while sodium hydroxide is a stronger base than lime and is just as effective or perhaps more so, in neutralizing hydrogen sulfide, lime presents fewer operating difficulties and has other advantages which will be discussed later.

Ammonia is not only itself unstable, but the sulfides formed decompose at the temperature of cracking. It is used principally for neutralizing hydrogen chloride in the condenser. However, mixtures of ammonium hydroxide with sodium hydroxide have been used to advantage in pressure stills. Ammonia is the only volatile neutralizing agent of the group, hence it has particular value in neutralizing corrosive agents in the vapor zone, whereas the other reagents must effect practically all of the neutralization in the liquid phase.

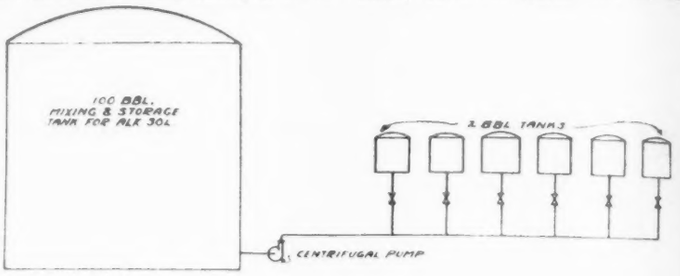
Sodium carbonate, while containing only 75 per cent of the alkali content of sodium hydroxide, calculated as Na_2O, is much cheaper per unit of alkali.

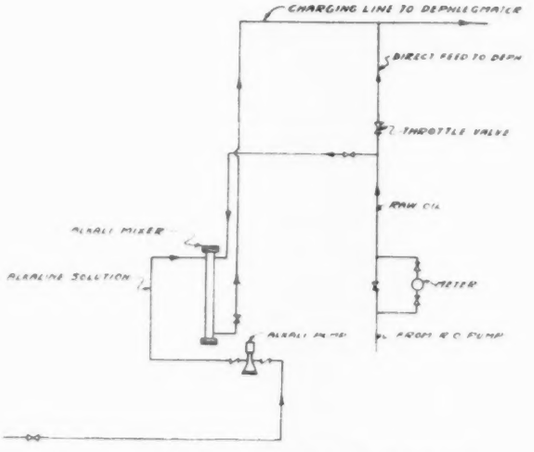
General Method of Injection

Ammonia is used principally to neutralize hydrochloric acid resulting from the hydrolysis of chlorides of the alkaline earth metals, magnesium and calcium. the ammonia or aqua ammonia diluted to a suitable concentration, may be introduced directly into the vapor line leading to the condenser. The advantage of the aqua ammonia is that it dilutes the hydrochloric acid while neutralizing it.

Caustic soda or soda ash is injected into the system by making up solutions of proper concentration and regulating the amount fed. A suspension of hydrated lime is made and fed into the system in a manner similar to that for caustic soda and soda ash.

The favorable point of introduction in a cracking system has been determined by trial and the place found most satisfactory at present is the charging-oil line which leads to the dephlegmator or the heating tubes, or to both. The solution entering the feed line mixes with the oil to be distilled. The water evaporates from the alkaline solution in the dephlegmator, leaves the system with the oil vapors, condenses with the oil distillate, and collects with it in a receiver. The chemical reagent is dispersed in the oil and passes through the heating element to the vaporizing chamber. The amount of reagent used is small and likewise the quantity of water. The chemical reagent is introduced uniformly in proper concentration into the system, and no detrimental effect upon the operation of the cracking units has been observed.





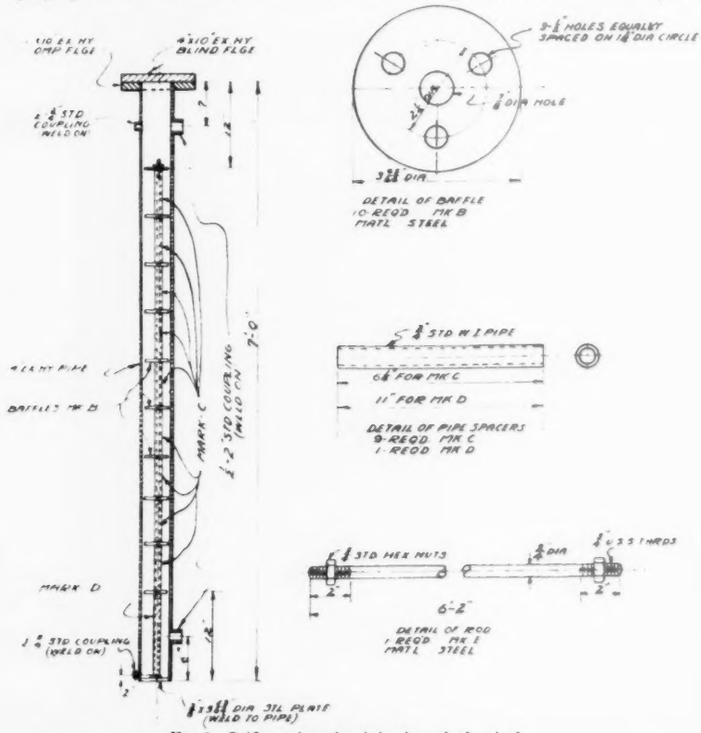
No. 3—Storage tank and small feed tanks.

As the segregation of lumps of the reagent is detrimental, a thorough dispersion throughout the oil is desirable. To accomplish this, the oil, or a part of it, and the reagent are passed through an orifice mixing column and the mixture of oil and reagent is then passed into the raw oil line leading to the dephlegmator. The details of such a column are shown in Figure 1.

Design of Mixing Column

In order not to place too great a pressure upon the charging pump, the amount of the back pressure is fixed e.g., at 10

(Continued on Page 101)



No. 2—Orifice mixer for injection of chemicals.

*Paper presented at meeting of American Institute of Chemical Engineers, St. Louis, December 5.

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ALUMINUM PAINT

The "Coat of Metal" Protection

ALUMINUM PAINT has its special advantages to industries of all sorts. To some it means added efficiency, to some actual saving of the product, and to *all* it means protection to property and equipment.

The particular application of this paint to the Oil Industry is told on the following page.

Manufacturers and jobbers of the best grades of Aluminum Paint use Albron Pigment as the base of their product. Albron Pigment is always made of pure Alcoa Aluminum.

Trade ALBRON ALUMINUM BRONZE POWDER Mark

Aluminum Company of America
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Offices in Eighteen Principal American Cities
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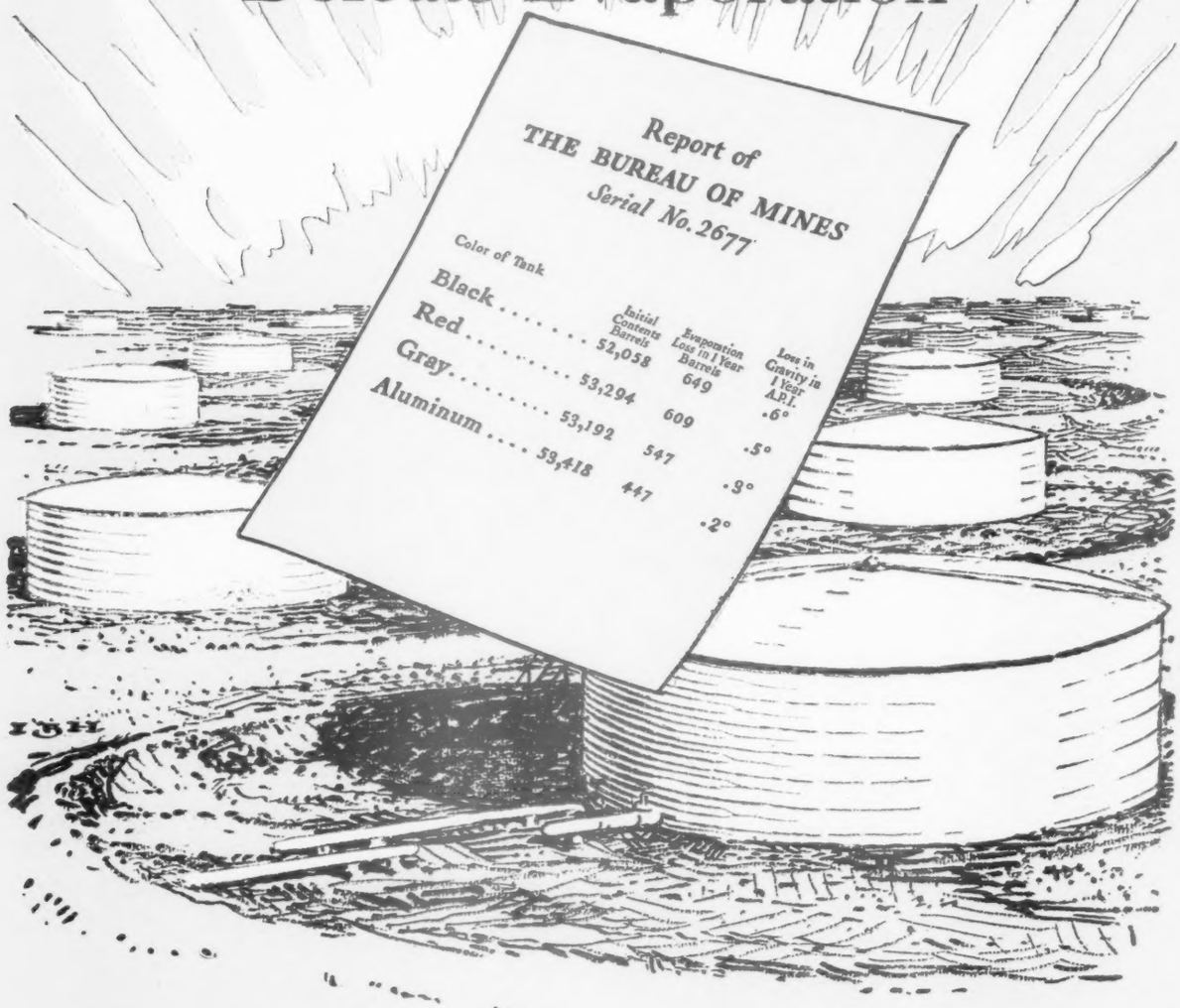
ALUMINUM IN EVERY COMMERCIAL FORM

ALUMINUM PAINT
Defeats Evaporation


Report of
THE BUREAU OF MINES
Serial No. 2677
Color of Tank
Initial Contents Barrels
Evaporation Loss in 1 Year Barrels
Loss in Gravity in 1 Year A.P.I.
Black . . . . . 52,058 649 .6°
Red . . . . . 53,294 609 .5°
Gray . . . . . 53,192 547 .3°
Aluminum . . . . 53,418 447 .2°

NOTE the saving in evaporation that Aluminum Paint effected in a test by the Bureau of Mines. *100 barrels per year per tank* is the saving over its nearest competitor among the colors selected by the Bureau as practicable for the purpose.

And Aluminum Paint keeps its color—does not get dingy and lose its reflective quality.

Aluminum Paint—a coating of pure metallic aluminum—reflects the sun's rays and keeps the oil cool. It also is protection against rust and fumes—even being resistant to the action of hydrogen sulphide. Its long wearing quality—the saving in evaporation—the protection it affords to tanks, pipes and buildings—make it a real money-saver, and it costs no more than ordinary paints.

Write today for "Aluminum Paint" booklet.

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ALUMINUM IN EVERY COMMERCIAL FORM

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Purchasing A.P.I. Standardized Material

Purchasing Agents' Viewpoint Set Forth. Practical Results of Plan Appraised. Wholehearted Acceptance Urged

By R. M. Ketchum*
General Petroleum Corp., Los Angeles, Calif.

It is said with sincerity that I am glad to appear before this convention to represent, I trust faithfully, a most important factor in American business today—the purchasing agent.

I have been asked, first, to be frankly critical in commenting upon the efforts of the American Petroleum Institute from the purchasing agent's viewpoint, and secondly, to show the beneficial results achieved by the American Petroleum Institute, also from the purchasing agent's viewpoint. It is to be distinctly understood at the outset that whatever criticism is made will be made with the most friendly intent, with the hope that it will prove constructive and assist in a minute way to bring ultimate and lasting success to this undertaking in which all of us are so vitally interested.

Simmered down to essential facts, you are attempting to ultimately reach two objectives through your standardization program: First, standardization in the manufacture of materials; and, secondly, economy of maintenance of these same materials after purchase, as a result of this standardization. In short, you are seeking to reduce a complex situation to a simple situation.

Now, presuming it is of some importance, what is the attitude of the purchasing agent toward the American Petroleum Institute? Remember, please, my observations may not reflect the collective attitude of the purchasing fraternity, still, I feel that my expressions at least mirror the attitude of the purchasing agents of the major operating companies in California. Quickly stating a fact, we are enthusiastically in accord with the results already obtained by the American Petroleum Institute and stand, as well, ready to vigorously add our support to your future projects. We feel this way because we see, from results already produced, that the American Petroleum Institute fosters the twinship so vital to business success—economy through standardization.

Further, may something you already know be repeated by way of corroborating the preceding statement? The Oil Buyers' Group of the National Association f Purchasing Agents at their national convention held in Grand Rapids, Mich., in June of this year, prepared a resolution offering their services to the American Petroleum Institute for whatever assignment of duties this institute might indicate, and further, outlined a possible plan whereby they might promote your projects.

Three Reasons for Offer

There was a threefold reason for our offer to you. The first was entirely selfish; we desired to become as a body actively identified with the American Petroleum Institute to strengthen our effectiveness in the business world. The second reason was patriotic, primarily, because your aims are in harmony with the United States Department of Commerce in their efforts toward standardization. The third reason was because many purchasing agents are in charge of the salvage or reclamation department of their companies, and anything having to do with standardization of units of materials is of intriguing interest and of obvious importance to purchasing agents.

On this last mentioned subject, salvage. It is confidently predicted that as American Petroleum Institute standards become generally used, that bugbear of the oil business—obsolescence—will become incidental only and the welcome consequence will be that the line on the graphic chart showing materials reclaimed, repaired and returned to service for a second stint of duty will rise with pleasing speed.

I feel well enough acquainted with business to appreciate some of the tremendous difficulties which have obstructed your progress and which may continue to impede your efforts, provided you tolerate such impediments. Let us explain the foregoing by comparing an American Petroleum Institute committee preparing to adopt a certain standard to a purchasing agent attempting to decide the purchase of any certain commodity.

The purchasing agent at the outset of a purchase negotiation knows—or should know—very definitely what specification will best fulfill the requirement. After receiving his quotations, presented in person by the several sales representatives, his original, clear ideas may be somewhat befogged.

He must then select those vendors of definite reputation to counsel him in his final decision. Just as you of the American Petroleum Institute have turned to the manufacturers of clean standing for the benefit of their counsel in making your final decision. While both salesman and manufacturer will doubtless strive to secure the adoption of their particular ideas, the fact remains that their assistance has been in both cases to a great extent responsible for the success of the purchasing agent as a class and the American Petroleum Institute as an institution.

Brains of the Industry

May I say this in all seriousness to you men of the American Petroleum Institute: You do not represent the brains of the oil industry. You are the brains, the collective intelligence of the industry. That being the truth, you know with very definite certainty the design and construction of materials which will most efficiently and economically meet the needs of this industry of ours. You know these things from experience. Within this industry there are accomplished technicians, competent in all of the various sciences pertinent to the production, refining and transporting of oil. I do not wish to suggest that you be clannish and provincial, but with this vast supply of ability and knowledge existing in the ranks of the American Petroleum Institute, need you go to the manufacturers for their instruction as to what is best to carry on your business? Should it not be that you will decide what will best do your work and you will collectively instruct the manufacturer what he shall make for you and then together, operator and manufacturer, work out any problems in manufacturing which may appear? You should, because you are indeed, as a body, the composite purchasing agent for the entire oil industry and as a purchasing agent you are perhaps the most influential buyer in the history of the world. As the purchasing agent, then, you possess what is known as the buyer's prerogative. It is perhaps not necessary to add that this prerogative must and should be used justly and fairly and impersonally.

Your organization has undertaken a task which in the ensuing few years will have moulded the entire manufacturing structure of the oil industry's orbit into different form than now obtains. In due time, as standard after standard has been adopted by this institute, the question of price, buying price, will most naturally manifest itself in your collective minds. The arousal of this question will be most natural, for this reason: If, say, 10 manufacturers produce any given articles to conform to precisely the same sandard, if, then, a difference in the buying price exists, there must be a reason and you will surely be desirous of knowing why. You will, of course, learn the reason is found in the fact that efficiency exists in some factories and not in others.

Inefficiency Expensive

Inefficiency costs dollars, and as you will refuse, of course, to pay more money for one article over another, both articles being precisely alike mechanically and of the same intrinsic value, you will eliminate from the selling field the inefficient manufacturer and thereby efface from the balance sheet of the nation an economic waste. By the same token, having eliminated economic waste, you have increased the wealth not only of the nation but of the oil operators as a class and as an individual.

Before dismissing the manufacturer, let this opinion be expressed: He will doubtless be pleased to receive from the various committees definite instruction expressed through specifications. While it remains true that he will, as already stated, work vigorously to have his particular ideas adopted by the American Petroleum Institute, it is felt that once he clearly understands that you, not he, will dictate the design to be adopted, he will engineer production posthaste in strict accordance, if possible, with your ideas. Because such action will mean sales to him and sales usually symbolize profit.

The foregoing has been said with a clear understanding that up to the present time you of the American Petroleum Institute have not troubled yourselves particularly with the quality of materials which go to make up the finished articles. In the course of time, however, you will. You will do so whether you desire to or not, because it will become increasingly mandatory as time goes on that you do so. It is just as important that the metals be of the proper analysis, properly heat treated and worked, as it is important that the taper and threads and fits and tolerances be uniform in any finished article made from the metals.

It strikes me, this institute holds in the hollow of its palm the secret of absolute elimination of the trial and error method of proving the thousand and one specialties which appear each year on the market, created by ingenious minds to fill some particlar niche in the oil world. Many of you are doubtless better posted than am I on the question of "try outs," so-called, of these various and sundry specialties throughout the oil fields.

Now, as regards these "try outs." May it be suggested that retaining the identical division of the oil world which you have already established for standardization work—Eastern, Mid-Continent, Louisiana-Arkansas, Texas, Rocky Mountain and California districts—you select and appoint with careful thought technical men under whose supervision tests on these previously mentioned specialties will be made as they appear.

Basis of Plan

The general plan to be followed might well be based, fundamentally at least, on the plan used since 1901 by the Underwriters' Laboratories. Outlining briefly, a manufacturer desiring a try out or service test woud make application for test to the purchasing agent of any oil company or to any member of the regional test committee. The applicant would be supplied with the proper American Petroleum Institute application blank provided by the American Petroleum Institute. This application would describe his product, its purpose, character, size, etc., and accompanied by drawing or illustrative cuts would be handed by the purchasing agent of committeeman to the regional test chairman. The committee would analyze the need of the industry for an article as described in the application for test. If no apparent need was manifest or if no greater efficiency could be gained or if no economy could be realized, then this application, so far as the American Petroleum Institute is concerned, would be rejected, possibly with constructive suggestion to the manufacturer for a revision as regards design. Otherwise, the application would be accepted and test begun. The general result should show the saving of many dollars now utterly wasted through the indiscriminate and ill-advised conduct of so-called "try outs," which mean nothing so far as profitable results are concerned to either the operator or the manufacturer himself.

The practical results of such a plan should be twofold. Firstly, new materials would be purchased for practical and scientific test, instead of as now for an indifferent, unscientific try out; and the results given by these materials would be, under this plan, alertly observed by these testing engineers. The reports would be based upon fact, under the eye of technical skill, and not upon the untrained observation of nontechnical men. The reports would be given the industry at large and not confined to the concern making the observation. Secondly, such an arrangement would permit of the prompt, economical investigation of newly created specialties. Prompt because of the eternal search by the oil industry for new and economical means to perform the task of producing and refining oil, and economical because, ordinarily, the try out involves the expenditure of like amounts of money by several oil operators; whereas, by this plan one expenditure in each region would serve for all, unless the manufacturer would supply the material for try out without cost, in which case the expense involved would be somewhat reduced. However, it is thought that nothing should be accepted from any source gratis, for obvious reasons.

Executives Should Decide

In whose hands does the ultimate verdict at present rest as to the merits or demerits of these articles? Does it rest, as it should, finally in the hands of the executive of the oil companies? It most certainly does not. Generally speaking, the destiny of these products is controlled by the field workers: the drillers, the tool pushers, the pumpers and superintendents. This is wrong but can be effectively corrected, provided this institute wishes to correct the situation. Without question, you wish to correct this condition of things because, truly, each one of you has by his very membership in the American Petroleum Institute pledged themselves to work unselfisly for the progressive, constructive, economical improvement of the oil industry as a whole and not for your particular concern only. Now, mention of the driller and his field associates was not made to belittle the ability or judgment of these men. This reference was made because as a general thing these really capable field men in our industry have enough to think about with their business in hand—that of drilling wells and producing oil—without being called upon to act as judge and jury in the adoption

(Continued on Page 118)

*Before American Petroleum Institute, Chicago.

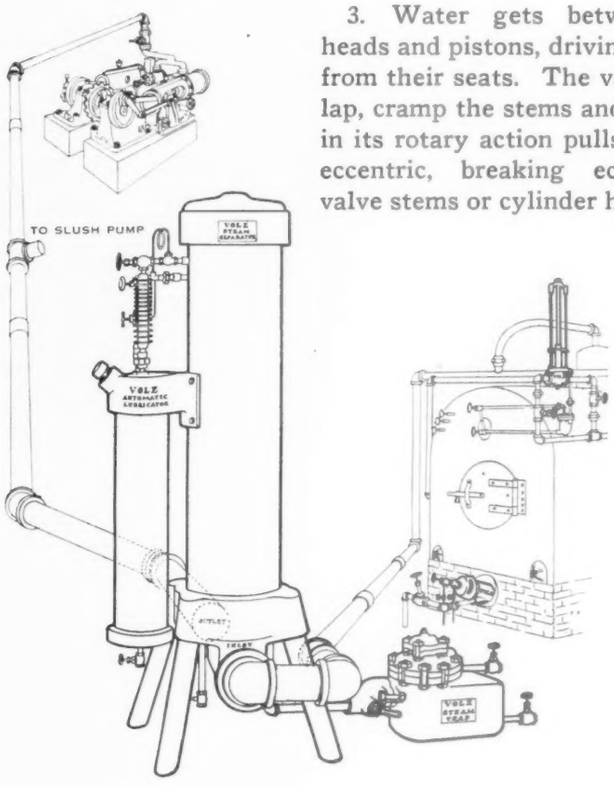
The GREATEST $350 worth of equipment you can buy for *a steam drilling rig!*

Beyond a doubt, the W-K-M-VOLZ Steam Separator and Automatic Lubricator is the greatest $350 worth of equipment you can buy for a steam drilling rig. Read what it does and what it saves, and then send the attached coupon for full details. Or write, wire or phone to arrange for a demonstration on your own lease, in any field.

HERE'S FULL STORY CONDENSED FOR EASY READING

1. Efficiency Engineer's tests have proved conclusively that all steam lines have a water film around the inside of the pipe due to radiation. In a horizontal line this film often becomes a considerable stream flowing along the bottom of the pipe. In a three-inch steam line, condensation averages one gallon of water per hundred feet per minute.

2. It has been repeatedly proved by throttling calorimeter tests that the W-K-M-Volz Automatic Lubricator-Steam Separator Unit delivers 99½% to 100% clean, dry steam from any length steam line. It is doing it on lines 1200 feet or more long.



3. Water gets between cylinder heads and pistons, driving valves away from their seats. The valves being on lap, cramp the stems and the eccentric in its rotary action pulls the strap off eccentric, breaking eccentric rods, valve stems or cylinder heads.

4. Engineers know that oil vaporizes and lubricates only when in contact with dry steam. Wet steam and water cannot be lubricated. They merely flush oil through the steam line wastefully.

5. The main steam line enters Separator at an angle causing the wet steam to whirl around an inner skirt and baffle plates, throwing out water, scale and sediment which drops to the bottom and is removed by the steam trap without loss of steam.

It eliminates engine knocks, water slam and the delay and expense of shutting down to replace broken parts because it removes all wet steam and water from throttle to boiler by centrifugal force, not by gravity alone as is commonly done, delivering only clean, dry steam.

This dry steam is properly and economically lubricated by the Automatic Lubricator regardless of weather temperature, because the Lubricator top casting which is attached to the Steam Separator and is controlled by the difference in pressure between Steam Separator inlet and outlet, transmits heat to the oil. Lubrication is controlled by the difference in pressure between Steam Separator inlet and outlet. The oil feed is adjusted at peak load, after which it need not be changed as it automatically varies feed with varying difference in pressure according to load. When engine stops oil feed also stops because pressure at inlet and outlet is then equal. The saving in oil is obvious, consumption frequently being reduced 50 per cent or more.

6. It has often saved its cost on a single well, is so simply and sturdily built that apparently it never wears out and it costs nothing for maintenance.

Features of W-K-M Volz-Steam Separator at a Glance

$350.00 F. O. B.
Houston, Texas

1. Removes all water, and delivers pure, 99% dry steam to engines and pumps.
2. By removing water, Separator gives at least 20% to 25% more power and efficiency to any steam drilling engine, or any slush pump. When you crack the throttle of an engine equipped with a W-K-M-VOLZ Separator, it is just like throwing the switch on an electric motor. You get the same quick, live response—with all sluggishness gone.
3. Eliminates shut-downs due to broken valves, valve rods, cylinder heads, cylinder gaskets, eccentric straps, etc., by preventing water from reaching engine.
4. Provides perfect lubrication by atomizing oil and mixing it with steam furnished engine and pumps. Atomized oil can not be flushed out exhaust. Check the ground under your engine exhaust, and note the puddle of lubricating oil.
5. Permits boiler to be located from 300 to 3,000 feet from engine, thus avoiding danger of igniting gas or spraying oil when well is drilled in.
6. Lengthens life of engine and pumps by fifty per cent by furnishing atomized lubrication.
7. Permits "cracking" throttle at any time, even after a shutdown of some duration. No need to run engine slowly on starts.
8. Cuts oil consumption 25% to 50% by regulating flow of oil in accordance with volume of steam being furnished. Lubricator cuts off automatically when engine and pumps are shut down, and requires no attention.

W-K-M COMPANY, INC.

HOUSTON, TEXAS

Exclusive Distributors, except in California

SEND THIS COUPON TODAY!

W-K-M COMPANY, INC., Houston, Texas.

Gentlemen:—You may send us full details covering the W-K-M-Volz Steam Separator and Automatic Lubricator, to the following address:

Name .....

Street .....

City .....

State .....

Successful Methods of Fire Prevention

Outline of Means Adopted for Protection of Eastern Refinery. How Fire Hazard Is Reduced by Forethought

By C. J. Cutting*
The Atlantic Refining Co.

The subject of fire prevention and methods of fire protection have received renewed study and attention from the petroleum industry during the past few years, and many important developments and sound, recommended practices have been presented before the American Petroleum Institute.

It is our purpose to outline briefly some of the methods which have been developed by the Atlantic Refining Co. at the Philadelphia plant in the study of refinery fire prevention and protection.

Design

In order to help reduce the fire hazard in a petroleum refinery, such hazard should receive careful consideration in the design and specifications of proposed structures and equipment. The designing engineers should have a very clear conception of the conditions of operation and functions of each unit, and its relation to surrounding equipment. These conditions should include a consideration of all available data on temperature, pressure and possible corrosive effects of the products processed so that proper allowance can be made in the design for the effects of such conditions.

To accomplish this end, our engineering department is kept informed by participation in conferences and exchange of data with our development, operating and inspection groups on all manufacturing equipment performance, more especially on high pressure cracking and continuous distillation units. By this cooperative arrangement the department receives the benefit of all available knowledge on the conditions of operation of new installations.

The recommendations of our engineering department concerning the fire protection features of new plant extensions such as drainage facilities, location of fire and foam plugs, hand and semiportable extinguishers, fire steam and alarm boxes, are reviewed and approved by the plant fire committee before being installed.

By the application of these methods we believe we have reduced the fire hazard and provided the right type and amount of equipment for protection on new additions to our plant.

Inspection

The intelligent and regular inspection of manufacturing plant equipment is very essential in the reduction of fire loss and to this end an inspection group has been organized. All equipment operating under high temperature and pressure, such as cracking and pipe stills, is subjected to a very rigid inspection at regular periods. The inspection consists of external and internal observations, together with drilling and measurement of all the sections where corrosion and other agencies are liable to affect the strength of the unit. Tube elements of furnaces on cracking and pipe stills are measured for inside diameter after each run by a special measuring tool. If any elements are found below the standards which previously have been fixed as safe, they are removed. With drums or pressure vessels a hydraulic test is applied in addition to the observation and drillings. This inspection group has the authority to order the repairs necessary to place the unit in a safe operating condition.

By these inspections, results of which are carefully recorded, it is possible to estimate with reasonable accuracy the useful life of refining equipment. This, in addition to preventing fires, is valuable information for the management in their plans for future replacement of equipment.

To supplement the work of the inspection group, the regular fire department is utilized to check conditions of all general plant equipment. Drainage facilities, loading racks and buildings are gone over to see that they are in order. Tank roofs and fixtures are also covered in the general plant equipment inspection routine. All flame arrestors and venting equipment of tankage are under the direct care of the fire department. Every flame arrestor is inspected and cleaned monthly and new screens or plates are inserted as required.

In addition, of course, the fire department is required to inspect and have kept in good working condition, all actual fire fighting equipment in the plant.

A monthly summarized report showing results of all inspections made by the fire department on all equipment under their charge is presented and carefully checked by the management and plant fire committee.

Special Regulations

Before any open fire or flame, such as produced by a rivet forge, electric or acetylene welding, movement of a steam shovel, etc., is allowed, a written fire permit, signed by the fire chief and a department superintendent after investigation, must be obtained by the operator. We have found many cases where such operations would have been dangerous had they not been investigated and forbidden. A similar fire permit arrangement is in force covering the use of fires and open flames on board tankers, tugs and barges at our docks.

All trucks, cars and tractors must be provided with a hand fire extinguisher before they are allowed to enter the plant. If outside cars are not so equipped, a spare from the guard gate is loaned. The entire plant roadways have been reviewed and in certain sections automotive equipment is prohibited. One of our most disastrous fires was caused by a backfire from a motorcycle igniting an explosive mixture near a sewer manhole.

Fire Fighting Organization

A fire chief, one assistant and six regular firemen make up the permanent organization.

The plant is equipped with a standard fire alarm signal system with about 100 alarm boxes. Trained plant operators have been grouped into fire companies in all sections of the plant and they respond, when there is a first alarm fire, with the nearest hose carriage to the scene of the fire, provided the fire is in their zone. Four fire companies are assigned to fire trucks which they drive to the fire on all first alarms, regardless of the location.

For second alarm fires additional yard fire companies with hose carriages respond, together with the Philadelphia city equipment. We have received exceptional co-operation and help in the way of men and equipment from the city fire organization in the fighting of plant fires, and they have shown great interest in all of our fire protection problems. If occasion requires, a selected group of mechanics and operators are called in for moving lines or pumps and transferring stored products.

In extreme emergencies at night, holidays and Sundays, a siren is blown which summons additional selected mechanics and operators.

A one-ton truck and ambulance from our safety department also respond to fires. This safety truck is completely equipped with rescue apparatus such as McKay oxygen breathing device, blower type hose masks. All service gas masks, first-aid kits, ropes, stretchers and blankets.

Certain individuals from our fire organization have definite assignments during serious fires, such as care of oil separators, fire and foam pumps. Servicing of the city fire trucks with oil and gas by special messenger is also provided. Teams or trucks are manned and ready for the delivery of ashes from hoppers at our boiler plants, in case material is required for extra fire banks. Sufficient ashes are always left in these hoppers for this special purpose.

Fire-Fighting Equipment

In addition to the usual fire, water and foam pumps, lines and hose carriages, we have equipped four one-ton trucks each with 1,100 feet of 2½-inch hose and nozzles. These trucks are stationed at points where yard fire companies of six or eight men are available, and as stated before, they respond to all fire alarms. This plan of motorized yard fire companies was adopted due to the fact that a greatly reduced number of men were available with our modern refining equipment. Experience has demonstrated that these trucks arrive at fires at almost any point in the plant before the hand hose carriage companies. There is a keen rivalry with our truck companies as to which one gets into action first. These four trucks have replaced 18 hose carriages and reduced hose in service by approximately 4,000 feet.

Our regular fire foam solution system has been supplemented with the dry foam powder equipment. A five-ton truck and trailer, loaded with seven tons of foam-producing chemicals and four sets of ejectors, has been provided for use in case of tank fires outside the limits of the solution system, or in case the latter should fail to operate effectively. Portable extension foam poles are also available to introduce the foam into tankage. These poles are equipped with mixing chambers and can be raised to a height of 50 feet by a few men.

In case of extensive fires, a five-ton tool house truck and trailer, with closed van type body, is sent to the secene. In it are all kinds of tools and miscellaneous equipment such as shovels, pipe tongs, suction hose, etc., that may be needed to make emergency repairs or pipe line connections. Acetylene cutting tools, in the use of which all of our firemen have been trained, are included. The trailer is wired for electric lights and is ready for telephone connection to the plant system.

Occasionally at large fires, an extra transfer pump is required and for this purpose a 12-inch by 8-inch by 18-inch steam-driven pump is mounted on a trailer and fitted with attachments for rapid connection to steam and pumping lines.

Boilovers are always a menace in crude oil tank fires and as a result of recent experiments made by the Standard Oil Co. of California it was found that additional barriers of corrugated iron sheets greatly reduced the area covered by the burning oil. We have, therefore, equipped a trailer with corrugated sheets and stakes for their erection. On this same trailer are the portable hose shields to protect hosemen from the intense heat of a tank fire.

A 10-inch fire bank boring device whereby, if the drain inside a tank pit has become blocked, the bank can be drilled and the water removed, is also provided.

A 50-car gasoline loading rack has been equipped with a monorail on which is operated two 40-gallon foamite extinguishers. These can be quickly shifted to any point on the rack by one man. This provision of having effective fire-fighting equipment that can be handled by a few men is an important consideration in present-day refinery operatons.

For extinguishing small fires in our laboratory and testing rooms we have found asbestos blankets, about 3 feet by 4 feet, very useful. These are kept rolled up and are thrown, open, onto the fire. In many cases the fire is smothered out at once or can very easily be put out with a hand extinguisher.

On one of our recent pipe still installations a fire water curtain 136 feet long and 100 feet high has been erected, which completely screens one side of the installation from an adjoining receiving tank pit. This should be of considerable protection in case of fire, either in the tank pit or on the pipe still structure.

As our plant is located directly on the water front, fire around wharves and ships must be provided against. For this service, we have four of our tug boats equipped with high pressure fire pumps so that they can help fight a river or wharf fire or tie into our yard high pressure water system. Two sets of river fire booms are kept in readiness on skids on shore so that they can be pulled off, and extended around a ship on fire, or used to confine the flow of an oil fire on the surface of the water. A number of curved pipe nozzles are stored on the wharf so that a fire under the front of the wharf can be reached.

There is also one other installation which may be of interest, namely, the fire extinguishing equipment on a Diesel Electric tanker, the Motorship Point Breeze, recently put into commission. The protection for such tankers must be provided without the customary use of steam-driven auxiliaries. Due to the fact that a fire might put out of service all electrical generating equipment, a system independent of that source of power was installed. It consists of two main tanks, each holding approximately 400 gallons of carbon tetrachloride with connections to the air-starting supply system of the Diesel engines, so that the liquid can be discharged by air pressure, which is always available, from the tanks to spray nozzles. These nozzles are located throughout the engine and generating room. This arrangement is similar to the one where carbon dioxide is released from a container under pressure, but has the advantage of being independent of the restricted supply of carbon dioxide.

A motor-driven, high-pressure water pump with several outlets is available for hose service when the generating equipment is in operation. An exhaust gas waste heat boiler, with auxiliary oil burner, can supply a limited amount of top steam for oil tanker protection.

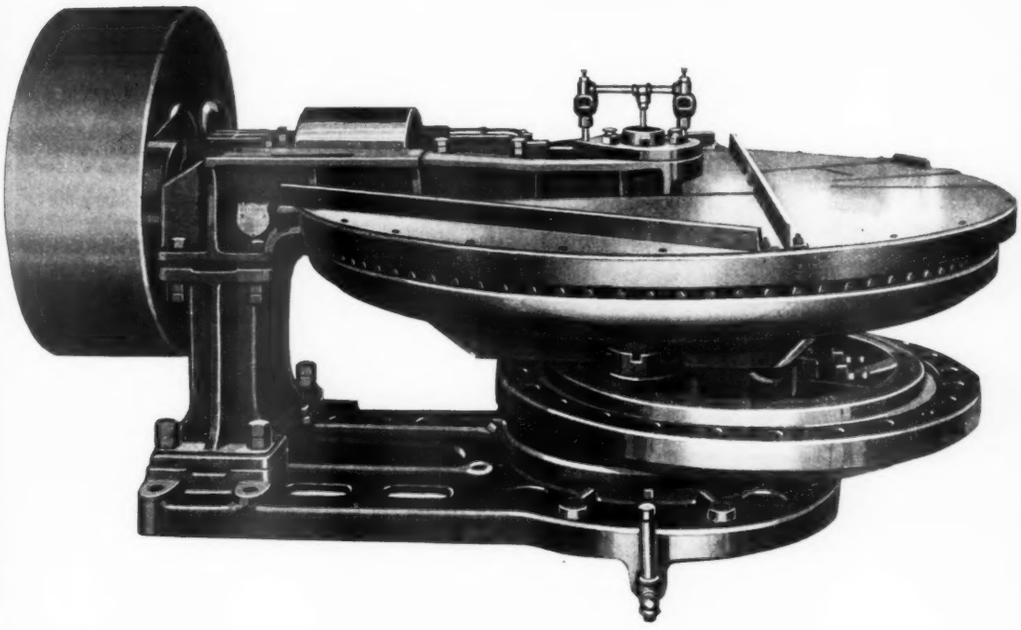
The hand extinguishers are also of the carbon tetrachloride type, the liquid being discharged by high pressure carbon dioxide gas released from small cartridges. These cartridges are located in the handle of the extinguisher and are punctured by the turning of a knob.

In connection with the dry powder foam equipment, which has been previously mentioned, we have a reel of motion pictures (supplied by courtesy of the National Fire Protection Co., Philadelphia, Pa.) showing a test of this system made at our plant, on a 30-foot diameter tank. This foam was introduced through a mixing chamber at the top of a segment of the shell at the distance of about 25 feet from the oil level. The total amount of powder used was 500 pounds, and the time required to put out the fire was two and one-quarter minutes.

Following this reel will be one showing our plant fire fighting equipment, which has been previously described.

The development of our fire prevention and protection measures has been due, in a large part, to the very active and personal interest taken in these matters by our management.

*At Eighth Annual Convention American Petroleum Institute, Chicago.



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THE

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COMPANIES

Some Advantages of Standarized Rigs

Benefits Can Be Had Only With Actual Possession of Knowledge and Product

By C. D. Watson*
The Carter Oil Co.

The story of the derrick is almost a story of the industry itself. It has been the symbol of petroleum since the drilling of the Drake well and perhaps no other single apparatus has been depended upon to perform so many difficult tasks, unless it be the derrick's companion—rig irons. These two have been the primary tools of the industry and they have performed their tasks well.

It is not the purpose of this discussion to go into a chronological history of the evolution of the derrick and rig irons but to properly approach the point at which the American Petroleum Institute undertook to sponser their standardization, it may be interesting to recall a few of the high points in their transition.

While rigs and rig irons are integral in their performance, due to the fact that the two have been treated separately by the Standardization Committee of the American Petroleum Institute, it is therefore more convenient that they be so discussed here.

The early derricks of course were all of wood construction, this being the most common and cheapest material available. The type and size of these varied widely, depending upon the individual ideas and requirements of the particular operator. This type of derrick was used almost entirely until late in the nineties, and along about this time, the manufacturers of steel towers and steel equipment became interested in the possible field for steel in the construction of drilling and pumping derricks. Several designs were patented in the late nineties and early 1900. It was probably 1903 when the use of steel derricks for pumping wells became noticeable. However, it was as early as 1907 that the first all-steel drilling rig was built and sold by the Carnegie Steel Co. I have not been able to get an opinion from any of the old-timers as to the efficiency and adaptability of these first steel rigs, but they evidently were to be improved upon since it was some years later before a definite trend toward steel and combination wood and steel derricks made itself felt in the industry. Even as late as 1922, a steel drilling derrick was a rare sight in many new fields. However, long before this time, steel pumping derricks had become quite common.

With the advent and more common use of the rotary system of drilling, a type of derrick was developed which is commonly called a combination derrick or turnbuckle derrick, which employs wooden legs with steel girts and braces. This type was a considerable improvement over the old all-wood derrick, in as much as the wood legs provided an elasticity which was supposed to be necessary during the drilling operation, and at the same time, the steel girts and braces tied in the wood members in a very satisfactory manner.

It was along about this time that the tubular steel derrick, the angle iron derrick and the combination derrick were coming into common use in the field as drilling derricks, both in the rotary and standard cable tool types. At the present time, the all-wood derrick is fast falling into the minority because of its low salvage value and limited durability as compared with steel. In the recently developed Seminole Field, of over 1,200 drilling derricks, there were only 27 all-wood derricks used, the balance being of all steel and combination steel and wood construction.

Standardization

In 1924, the A.P.I. Standardization Division had made considerable progress with the work of standardizing tubular goods and a committee was organized to effect, if possible, a standard for rigs and derricks, realizing that from the great number of types and sizes of derricks manufactured, interchangeability was impossible, and that it was highly desirable from an economical standpoint to have dimensional standards. This committee, composed of practically all of the manufacturers of rigs and derricks, a large number of operators and engineers, first started the work by checking the present types of derricks and found that there were between 200 and 300 of these, few of which were of any common dimensions, and few of the manufacturers had any definite idea of what load capacity, tensile strength or wind velocity their particular derrick would withstand. They seemed to have merely built a derrick that was supposed to be heavy enough to do the job and if it would not, the remedy lay in the addition of material where the last break came. After several years of intensive work and study, both technical and practical, the committee has compiled a complete set of specifications for rigs and derricks which call for 12 standard sizes of derricks, designed to suit the needs of operators in all parts of the United States. This, it will be noted, is a most considerable reduction from the some 200 or 300 sizes and types previously had.

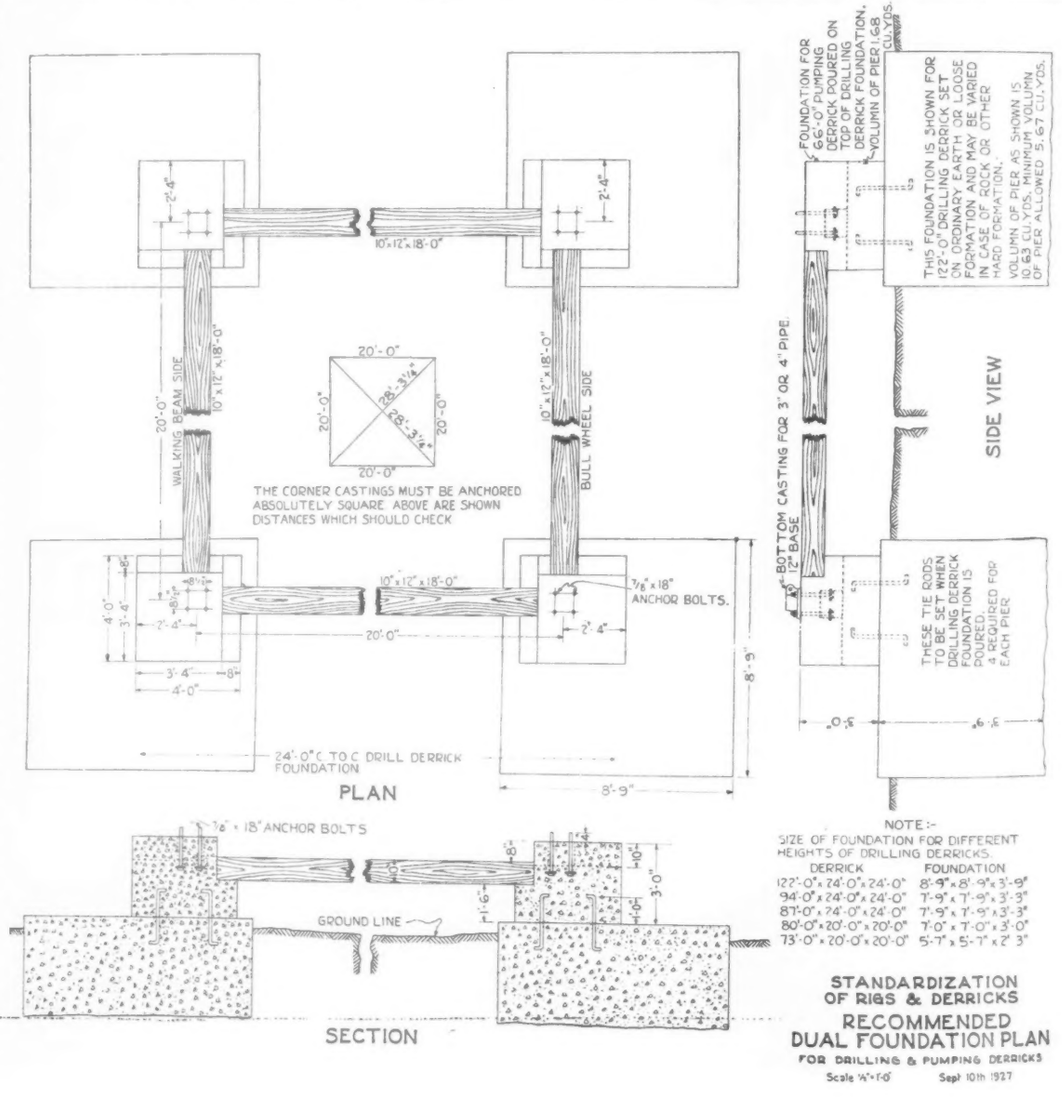
Under this A.P.I. standardization program, derricks can be obtained in practically any desired height. They are provided with ample and uniform water table openings which permit an interchangeability of crown blocks, and which is a most important feature from the producer's standpoint. In this program there are two systems of derrick towers provided for, one having an interchangeability of the derricks on the same common foundation; in other words, all derricks of similar construction, such as steel or combination wood and steel, having for instance a 24-foot base, will fit on the same piers, using the same foundation bolts. For example, a 122-foot drilling derrick with a 24-foot base and 5 feet 6 inches water table opening, may be replaced with a 94 or 87-foot production or pumping derrick which also has a 24-foot base. This change may be made without any change in the foundation, or, as has been previously pointed out with this system of bases, a 20-foot base derrick can be erected independently within a 24-foot base derrick before the larger derrick is dismantled; this, however, necessitates additional foundations.

Reducing Stocks

The other system provides for what is commonly known as the standard taper derrick. This series of derricks has a fixed water table opening, the uniform taper of the legs making the base size variable, depending on the height. One manufacturer provides an opportunity for lowering the upper part of the standard taper drilling derrick inside the original derrick base on to a smaller base already provided, thereby making a shorter pumping derrick. The production derrick can then be salvaged and re-erected as the upper part of a taller drilling derrick.

In fact, the upper parts of all derricks, from the 73-foot pumper to the 122-foot drilling derrick are identical, using the same gin pole, water table beams and crow's nest; the platforms also are interchangeable. Such a system naturally makes for a reduction in warehouse stocks, both on the part of the manufacturer and the operator, as well as providing a uniform or common derrick for all purposes.

The derrick's dimensions such as height, size of base and size of water table opening, have been made standard.


PLAN
SIDE VIEW
SECTION
THE CORNER CASTINGS MUST BE ANCHORED ABSOLUTELY SQUARE. ABOVE ARE SHOWN DISTANCES WHICH SHOULD CHECK
WALKING BEAM SIDE
BULL WHEEL SIDE
ANCHOR BOLTS.
GROUND LINE
24'-0" C. TO C. DRILL DERRICK FOUNDATION
FOUNDATION FOR 66'-0" PUMPING DERRICK POURED ON TOP OF DRILLING DERRICK FOUNDATION. VOLUMN OF PIER 1.68 CU.YDS.
THIS FOUNDATION IS SHOWN FOR 122'-0" DRILLING DERRICK SET ON ORDINARY EARTH OR LOOSE FORMATION AND MAY BE VARIED IN CASE OF ROCK OR OTHER HARD FORMATION.
VOLUMN OF PIER AS SHOWN IS 10.63 CU.YDS. MINIMUM VOLUMN OF PIER ALLOWED 5.67 CU.YDS.
BOTTOM CASTING FOR 3" OR 4" PIPE
12" BASE
THESE TIE RODS TO BE SET WHEN DRILLING DERRICK FOUNDATION IS POURED. 4 REQUIRED FOR EACH PIER
NOTE:-
SIZE OF FOUNDATION FOR DIFFERENT HEIGHTS OF DRILLING DERRICKS.
DERRICK FOUNDATION
122'-0" x 24'-0" x 24'-0" 8'-9" x 8'-9" x 3'-9"
94'-0" x 24'-0" x 24'-0" 7'-9" x 7'-9" x 3'-3"
87'-0" x 24'-0" x 24'-0" 7'-9" x 7'-9" x 3'-3"
80'-0" x 20'-0" x 20'-0" 7'-0" x 7'-0" x 3'-0"
73'-0" x 20'-0" x 20'-0" 5'-7" x 5'-7" x 2' 3"
STANDARDIZATION OF RIGS & DERRICKS
RECOMMENDED DUAL FOUNDATION PLAN
FOR DRILLING & PUMPING DERRICKS
Scale 1/4"=1'-0" Sept 10th 1927

*At eighth annual meeting American Petroleum Institute, Chicago.

The first oil well brought in –

Good Steel

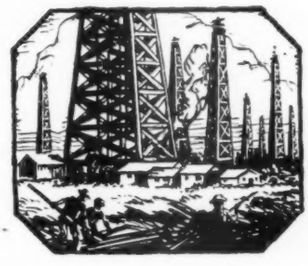
–assures success –*Today*

Times are not what they used to be
And they never will be what they used to be
The old order changeth.

In the development of better steel for oil well tools this company has kept pace with the advancements made in the Petroleum Industry.

Just making a good steel wasn't enough. Asco Steel is produced to furnish a BETTER STEEL for making oil well tools and we can prove this statement by the verdict of some of the leading drillers.

The problems of the man drilling for oil has been ours, and together we have been able to produce a steel that will REDUCE DRILLING and Fishing Costs. Write for further information.



"A Story of Steel and Oil" is a historical sketch of the Petroleum Industry. Write for your copy today.

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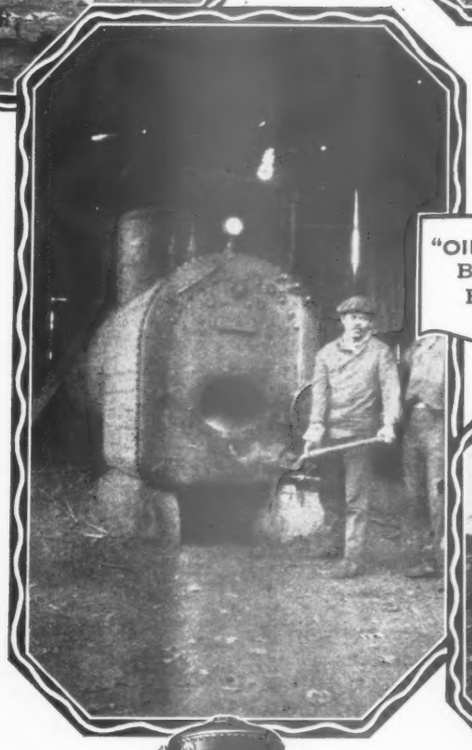
NEWPORT KENTUCKY

WHAT'S REALLY GOOD, FIND

"OILWELL" Boiler in Punjab, India

"OILWELL" Boilers for South America

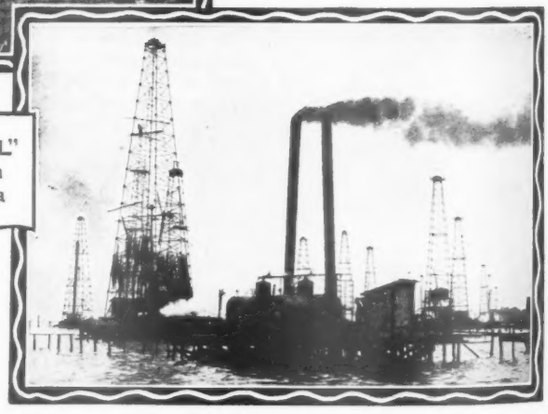


"OILWELL" Boiler in France

"OILWELL" Boiler in Bolivia

"OILWELL" Boiler in Spain

"OILWELL" A. S. M. E. Code Boiler with dome over wagon-top.



"OILWELL" Boilers in Venezuela

"OILWELL" ESTD. 1862. TRADE MARK. (REGISTERED)

OIL WELL SU

WORLD'S OLDEST AND LARGEST MANUFACTURERS OF OIL FIELD EQU

ITS WAY EVERYWHERE

"OILWELL" Boilers are in use in every oil field in the world, and are renowned for their steaming qualities, durability and workmanship.

They are built in A. S. M. E. Code Locomotive, A. S. M. E. Code Horizontal Tubular, Canadian Locomotive, and British India Locomotive Types.

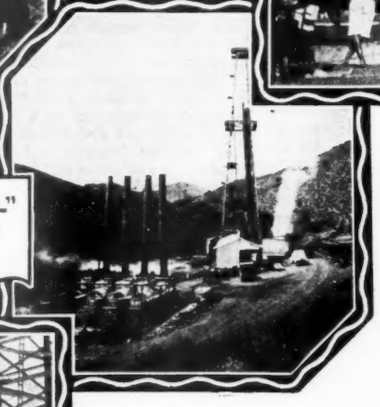
All "OILWELL" A. S. M. E. Code Boilers are built in strict accordance with the 1924 Code of the American Society of Mechanical Engineers. "OILWELL" Boilers can also be furnished in accordance with A. P. I. standards.

"OILWELL" A. S. M. E. Code Locomotive Type Boilers can be furnished for 150, 175 or 200 pounds working pressure, with dome located either over the wagon-top or over the barrel. Also either mounted or unmounted.

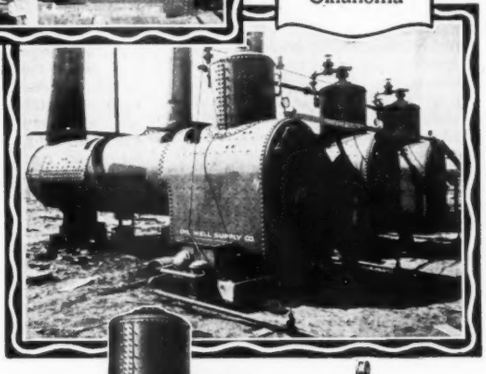
Send for special Bulletin, or inquire at any of our 100 Branches.

"OILWELL" Boiler in New Zealand

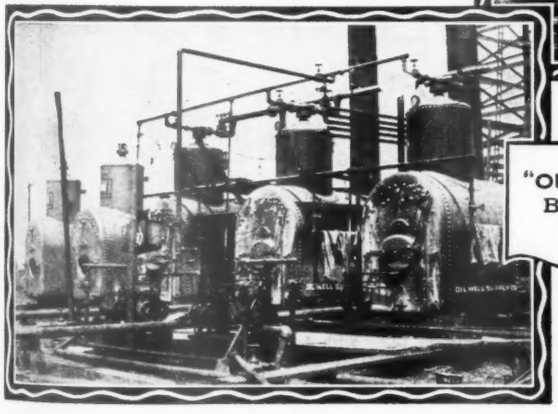
"OILWELL" Boiler in Java



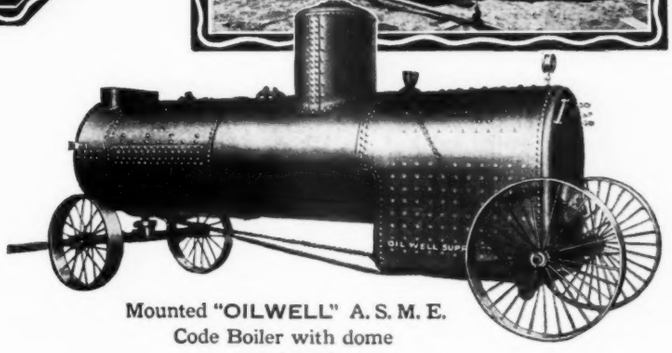
"OILWELL" Boilers in California



"OILWELL" Boilers in Oklahoma



"OILWELL" Boilers in Texas



Mounted "OILWELL" A. S. M. E. Code Boiler with dome over barrel.

SUPPLY CO.

EQUIPMENT

BRANCH STORES IN ALL OIL FIELDS

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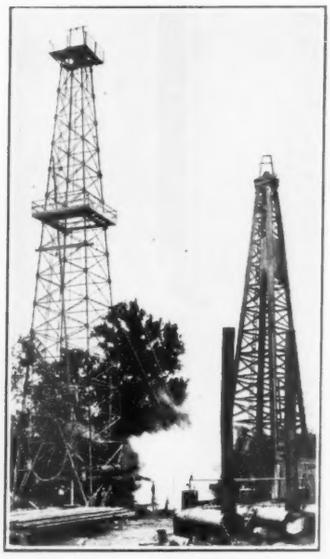
as have also derrick accessories and standard rig parts. The location of the drill hole, for instance, has been fixed, which facilitates a uniform design in floor foundation as well as the location of drilling and pumping equipment. The dimensions and location of window openings have been specified. Recommendations have been made for concrete foundations, and a code on the use and care of rigs and derricks has been worked out.

Considerable time and effort have been devoted to the compilation of common formulas for the determining of the dead load capacity and the wind load capacity of the derrick. These have been found extremely necessary in order that the manufacturer may determine just what



Old type 84-foot derrick (wood) gives way to the 122-foot all-steel tubular rotary driller.

loads his derrick is capable of handling and also that the operator have this same information which enables him to determine the ultimate load to which he can subject the derrick before failure of the derrick parts may be expected. All this information will be enumerated on a nameplate which will be attached to the derrick and which should better familiarize the driller and operator with what extreme loads, considering the safety factor, he may expect the derrick to withstand.

Drilling and Pumping

The advantages of being able to change from a drilling to a pumping derrick without having to change and rebuild the foundations are obvious. A pumping derrick of, for instance, 84 feet high and with a 24-foot base would cost a matter of $50 moe than the same height derrick with a 20-foot base, and if this derrick were to replace a 24-foot base drilling derrick, it would be necessary to rebuild the foundation which might vary in cost from $100 to $300 or more, depending upon the location and kind of ground. This additional cost would be in addition to the time lost while waiting for the cement to set, whereas if the base of the two derricks are the same, the only time lost is for dismantling derrick and the erection of the pumping derrick.

There should be many advantages gained by the men who erect the A.P.I. derricks in the field and by the drillers who are to use them, in that as previously mentioned, each derrick of a given type will be of the same dimensions and it should therefore be easy for the crew to familiarize themselves with the different parts without any difficulty. The greatest advantages will be to the purchaser and operator in the sense that for his particular purpose, his stock in the field and in his warehouse will consist of probably two or possibly not more than four sizes of derricks, upon which he can standardize for his own operations. This will mean a great reduction in stocks of parts and replacements, greater salvage value and eventually a reduction should be realized by the operator in the original cost of the derrick. The manufacturers of derricks are all desirous of seeing the industry adopt A.P.I. standard derricks as rapidly as possible, realizing that by such a move, their stocks both raw and manufactured will be greatly reduced, allowing them eventually to secure a greater turnover with a reflected reduction in the cost of their product to the consumer. Naturally, some of the changes which were necessitated by the A.P.I. standards have meant considerable additional cost to the manufacturer, making changes in his manufacturing equipment. This cost will have to be absorbed by the new product until such time as the A.P.I. standard derricks will be greatly in the majority, and special order derricks will then have to absorb the additional costs of special designing and special manufacturing, as they are doing today.

Rig Irons

Rig irons—these necessary parts of a rig are so commonly known to the driller and production man that it might seem almost superfluous to attempt to analyze them. Through the years they have not been changed greatly in appearance, yet they have gradually become heavier, and in late years, the material has become improved to take care of the ever-increasing strains to which they have been subjected. However, these changes and improvements are not uniform with all of the manufacturers and great difficulty and expense has been had by the operators through faulty rig irons and the fact that practically none of the parts of one manufacturer would fit with the parts of another.

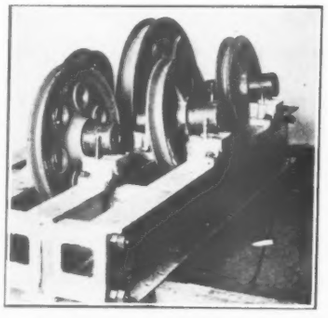
Everyone who has had experience with rig irons can readily recall any number of instances where wells have been drilling, a rig iron became broken and could not be replaced except by that one manufacturer from his base of supplies or at the mill, and in the meantime, the well must be shut down until the necessary parts arrive.

It has been estimated that from 1869 to date, there has been approximately $350,000,000 spent for rig irons and rig iron outfits, and H. J. Lockhart has pointed out that while in the early days, rig irons were light and did not represent much money, but had standardization been accomplished then and had the early operators had the vision to foresee and inaugurate what is now being accomplished by the standardization committee on rig irons of the A.P.I., there could have been saved approximately $35,000,000. Information gathered from operating companies segregated and compiled by those in charge of standardization has shown that an approximate total of 15 per cent can actually be saved by the use of standardized irons; 10 per cent of this total would be accrued to the purchaser. These percentages may seem somewhat small but it must be remembered that it is spread over the entire purchases of the industry whereas in an individual case, where interchangeability of irons is required, the saving might amount to an extremely high figure.

Advantages Realized

The specifications of the rig irons committee as worked out by practically all the manufacturers of rig irons, representative operators and engineers, have been completed for over a year now and production of these irons has been going on for some months by the manufacturer. In the Seminole Field, which is the one with which we are most recently acquainted, there have been about 75 sets of standard A.P.I. rig irons used, and from an investigation of these, we find that they have been highly satisfactory and desirable to the men who are using them. There were 746 complete new sets of rig irons in use, representing approximately $750,000. Considering the fact that license has been granted for the manufacture of rig irons under A.P.I. standard specifications within the year, we feel the fact that about 10 per cent of the irons in this new field are standard A.P.I. irons, shows that some progress has been made, and that the advantages of the new irons are realized by the operators.

In order to make a very definite and specific test as to the interchangeability of rig irons made under the A.P.I. specifications as compared with those previously manufactured and which were not interchangeable, we recently secured old style rig iron parts from two different manufacturers and attempted to assemble them. However, due to the fact that the integral dimensions were not the same, we were unable to make the parts fit together in any kind of workable manner. Then the parts of two different manufacturers as made under the A.P.I. specifications were assembled, taking the



Crownblock pulleys of different manufactures, as made under old practice, showing assembly impossible.

crank shaft, flanges and one jack post box with saddle of one manufacturer and one jack post box, wrist pins, two side irons, caps, sprockets and clutch of another manufacturer and after the assembly of these, we found that all of the parts fitted together perfectly. This test was made a the Industrial Exhibit of the Tulsa Purchasing Agent's Association, where the parts were made available by the different manufacturers.

Interchangeability

Another example was a test made of the interchangeability of sheaves and crown block bearings. A crown block was set up to accommodate six sheaves. Then sheaves and boxes of three manufacturers, as made according to the individual custom of each manufacturer, were assembled and it was found, due to the various lengths and diameters of trunnions and other differences in dimensions, that the assembly was impossible.

Then a similar test was made, using the A.P.I. standard sheaves of three different manufacturers. These were set in bearing boxes which were built to accommodate A.P.I. sheaves and then assembled in a common type crown block. The result was a complete assembly of all workable parts and showed that while there are many different types of crown blocks made having various kinds of bearings, methods of lubrication and nesting arrangement of sheaves, nevertheless there can be an interchangeability of dimensional parts when A.P.I. specifications are followed. Throughout the standardization program, considerable thought has been given to the utilization of old style equipment until such time as standardized equipment is wholly used, and the manufacturers are attempting to make the new equipment interchange with the old wherever it is possible; for instance, in connection with the chain-driven calf wheel attachments, one manufacturer has made a key that fits the A.P.I. standard shaft and also fits the keyway on the clutch formerly used, so that the chain-driven calf wheel attachments now on hand are being used with the A.P.I. standard shafts.

After Mr. Pew's committee on tubular goods had completed its specifications, there was apprehension on the part of some as to how rapidly the industry would adopt the new pipe. Most of this apprehension has been put at rest, however, since the pipe is being manufactured and used and has been found superior to the old pipe. The users are satisfied and are continuing their orders on the standard specifications.

This condition now prevails with rig irons. They are being used and found satisfactory and as soon as the operators become more familiar with the new irons, they will be universally used.

The A.P.I. standard rigs and derricks are now ready for manufacture and licenses have been granted or applied for and from assurances of the majority of manufacturers, the new standardized derrick is forthcoming. We are satisfied that slowly but surely, the A.P.I. derrick will replace the present types as the present types have replaced the old wood derricks.

One large manufacturer of rigs and derricks and rig irons who has over $3,500,000 invested in inventory, estimates that with the complete adoption of A.P.I. standards, their investment could be reduced to considerably less than $2,000,000. Naturally this reduction would be reflected to the purchaser.

Definite Knowledge

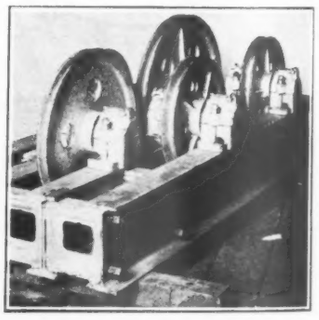
The standard A.P.I. specifications will enable the man who erects and used standardized rigs and derricks and rig irons on the job to always know the dimensions of these tools, how much load he can pull with them, just what he can do with them and at about what point he can expect them to fail.

Standardization of derrick dimensions makes possible the use of interchangeable houses, such as pump house, rotary engine house, bull wheel house and band wheel house. These can be moved from job to job as well as being used interchangeably on towers made by different manufacturers. With the standards in band wheels, shafts and sand reels, more progressive manufacturers are coming out with machinery supports having great flexibility. Jack posts are rapidly adjusted to A.P.I. shaft length, and sand reel posts are adjustable sidewise for shaft lengths as well as fore and aft for band wheel diameters, spooling and adjustment. This leads to unitary machinery supports with separate units that will fit up interchangeably to any size of derrick.

As has often been said and written, the advantages of standardization are considerably more than simplification of equipment and reduction of stocks, since the committees, who have been working along scientific lines, have had in mind giving the industry a more uniform and better quality of material, interchangeability and a higher workmanship of product.

Operations More Technical

Truly the operations of the industry have become more technical within the past few years and this tendency is bound

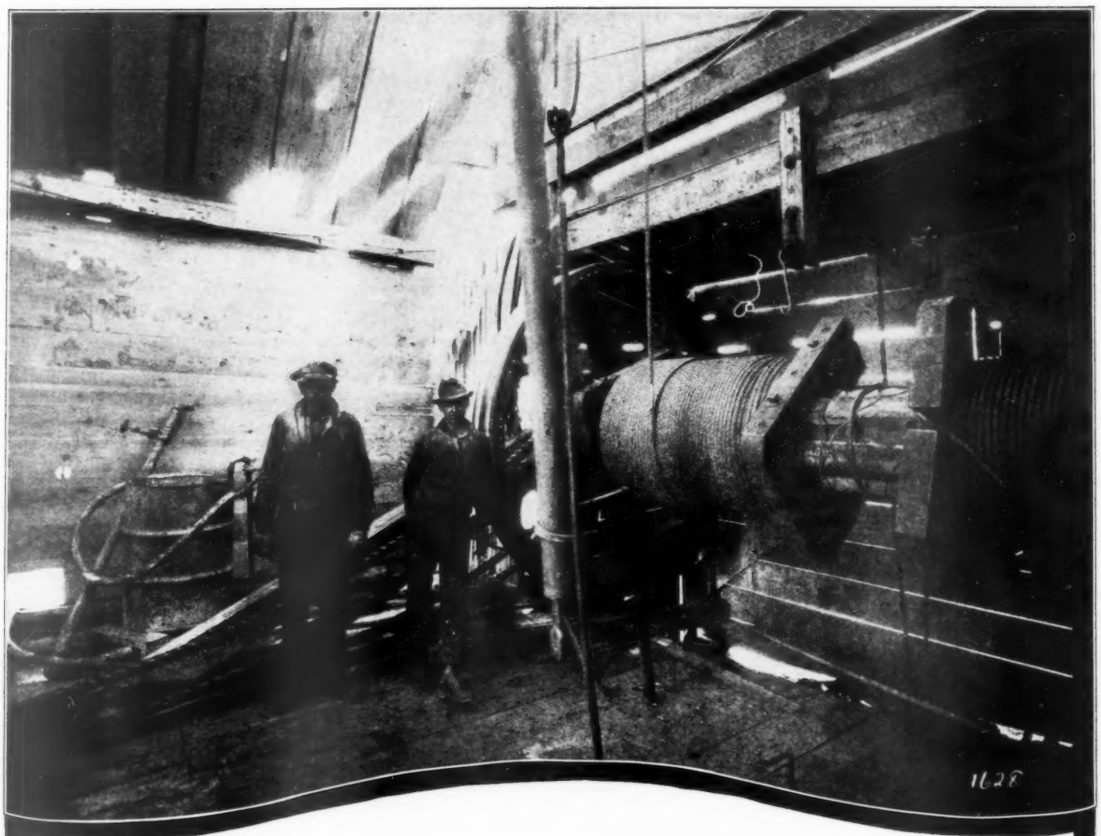


Crownblock pulleys, assembly of different manufactures, made to A.P.I. specifications, showing all parts assemble perfectly.

to increase with a more scientific study of its requirements and problems, what with deeper drilling and the ever increasing cost of operation, due to necessarily heavier and more efficient material and equipment, the industry has exacted greater care and ability in the selection and use of its material, and this has been uppermost in the minds of the members of the committees who drafted the specifications for the standardization of rigs and derricks and rig irons.

Ultimate economic operation, utilization of energy and equipment, elimination of waste, simplification of design, standardization—these are some of the terms of which we hear a great deal lately and on some of which we are not entirely

(Continued on Page 139)



W. A. Netherton, Driller *Clyde Small, Tool Dresser*

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Free Market Equipment Not Justified

Adds Greatly to Investment Without Any Compensating Advantages in Profits. Sales Volume Decreasing

By B. H. Anglin*
Indian Refining Company.

The interests involved in free equipment may be divided into four classes: first, the public; second, the equipment manufacturer; third, the dealer or retail operator; fourth, the marketer. As to the interests of the public, I believe it is an economically sound principle that once the cost of doing business finds a reasonably constant level, that cost must of necessity be absorbed in the price of the product, and certainly the practice of promiscuous leasing of dispensing equipment in the final analysis must cost the public much greater sums than any benefit it may enjoy as a result of this practice. I believe it is also economically sound that the lower the cost of a staple commodity to the public, the greater the consumption, and that any step tending to improve the ratio of volume to investment must ultimately result in lower cost and, consequently, be of direct interest and benefit to the consumer.

As to the equipment manufacturer, I am informed by Mr. Niedrach of the New Jersey Oil Trade Association, who has been most active in this movement, that in discussing the matter with equipment manufacturers they made the claim that there was a total lack of stability due to the inability to find a market among actual users of equipment where they could sell on quality and service.

At first sight it might appear that the elimination of loaned equipment would work a hardship upon the retail trade. I believe a little thought would convince anyone that there would be no one more greatly benefited than the retailer by the elimination of promiscuous leasing of gasoline and lubricating dispensing equipment. Today one can hardly drive 10 miles along any road within the United States without realizing that it has been made possible for many undesirables to enter the business, many of them wholly irresponsible financially, and credits and markets have suffered as a result. To quote William Thompson, district manager for The Texas Company and a member of the code committee of the Virginia Independent Oil Men's Association: "A man no longer needs the proverbial shoestring to open a filling station. All he requires is an idea that he should operate a filling station. The oil company informed of the idea will build him a station, install the latest types of equipment, pave the drives with concrete, stock the station with gasoline and oil, and even finance him to the extent of $1,000 to buy tires because the tire manufacturer had withheld credit."

Certainly in a given area in which a marketer already has sufficient outlet or equipment to service public demand for his product, the addition of a single pump has little or no effect other than that of diminishing the gallonage put through all other pumps within a given radius and directly hurting all the dealers, more particularly those who are already handling his product.

As to the complete elimination of the evil in the near future, I doubt if this can be successfully done, regardless of how many solemn and binding agreements may be entered into, until every marketer, large or small, has a much more accurate and detailed knowledge of his marketing costs than he now possesses and of the part played in these costs by the loaned gasoline pump. This will convince him that the practice is uneconomic and should fade out of the picture.

Better Accounting

There is a glaring lack of intelligence due largely to the more or less general practice of pooling the profit and loss results of producing, refining and marketing in one common accounting pot which so completely buries the relationship between marketing expense and marketing results that many evils now existing are completely lost sight of. If these were continually brought to the surface by better accounting, they would be gradually but nevertheless completely eliminated by mere common sense. Nor need this system of accounting be in any way a complicated one. Given a knowledge of possible gross spreads within which a marketing organization must operate, it does not require any advanced accounting knowledge to so allocate expense, as nearly as possible at the source of its occurrence, as to determine approximately which operations and investments are profitable and which are not.

Over the past year, our marketing business has been much like that of a retired Michigan merchant who purchased a plantation of some 600 acres in the Alabama black belt. Having purchased the property through on agency, he was riding over it with an old darkey for the first time and, questioning him. The man informed him that he was the overseer and that his father and, before him, his grandfather had been overseer; that it made little or no difference who the owners were, they were always the overseers. He said they grew a great deal of cotton and got good prices for it, but that there had been many changes in ownership. The new owner inquired as to why there had been so many changes if they could grow so much cotton and get such good prices for it. He was informed that "de ducks" got it all. "Dey's de duck for haulin', de duck for ginnin', de duck for warehousin', an' de duck for sellin', an' by de time all de ducks get through dey's nothin' lef' no mo'." I can assure you that one of the fattest "deducts" in the petroleum industry is the practice of loaning and leasing dispensing equipment.

Within a few short years, the loaned gasoline pump has become the inglorious parent of many other evils. Its offspring are the leased air compressor, the air tower, paved driveways, canopies, et cetera. A few short years ago, the marketer who, as a trade inducement, painted the front of a garage, was looked upon as indulging in unethical marketing, and yet today we are painting garages inside and out and extending our color scheme to those old-fashioned telephone booths which were originally designed to occupy some secluded corner and which now meet the eye scattered over the landscape painted in the most glaring colors. Most of this is marketing expense which is unnecessary, of no service to the public, and for which the public must in the end pay.

Nor is there anything to indicate that, in considering leased or loaned installations of any character, much thought is ever given to the credit of the account, and likelihood of the person represented surviving for any length of time, his sense of contract obligation and the possibility of his falling an easy prey to some competitor who may make him some temporarily better proposition. It is usually this type who argues that the other fellow will do it, who is always most insistent upon the marketer meeting his demands in the everlasting change in types and styles of equipment—this now having come down to practically spring and fall fashions—long before the life of the existing equipment can be exhausted or before it can be properly or conservatively written off the books. This gives rise to a condition in the industry where it would seem that, regardless of the expense to which a marketer may have gone in installing equipment., it can be thrown back on his hands upon the merest whim of an irresponsible account, much of the investment dissipated, with little or no recourse other than to go out and seize upon some competitive account and subject the competitor to a like loss.

Volume Decreasing

Even the most elementary consideration, that of volume to be derived, seems all too frequently to be lacking. The practice of dealers allowing several competitors to install their equipment is greatly on the increase, and with each additional pump at a given point the utility or value of each must be materially lessened. At the moment, I have in mind a pump which we installed a year or two ago, upon the earnest solicitation of one of our salesmen, in a picnic grove, or maybe a bootlegger's paradise. I have allowed the pump to remain in this particular location as a monument to the judgment of this particular salesman. As an assurance that we would remain undisturbed in the enjoyment of the gallonage at this point—some 600 gallons per year—we have allowed a 3-foot ditch to remain, over which any unfortunate who ran out of gasoline would have to drive in order to be serviced. Yet, within the last two months, a legitimate and presumably efficient competitor has placed within 10 feet of this pump one of its installations, and the magnificent yield of 600 gallons per year will now be split between us.

Those of you who have had dealings with salesmen know that pumps were installed a few years ago on the theory that they would produce 3,000 gallons per month; lately they have been installed on the theory that they will produce 1,000 gallons per month. I need hardly go into the matter of actual production after installation is made as compared to the salesman's estimates, nor will I hazard a guess as to what the salesman's estimate of production will be next year. It is an outstanding fact, however, that there is a sufficient number of pumps installed throughout the country to limit the average yield to about 500 gallons per month.

Equipment Cost

A single gasoline outfit installed will cost in the neighborhood of $250. Amortize or depreciate this equipment over a period of three years and you have an annual write-off of approximately $80. In addition to the initial cost of the equipment installation, the cost due to removal and transfers of equipment will, even for a small marketer, astound you if you figure it up. On top of this, there is a very substantial item for maintenance and upkeep of installed equipment the responsibility for which always goes with ownership. This will approximate $20 to $24 per year per pump.

Much of this expense is due to insignificant items of repair which the user of the equipment could easily effect himself at little or no cost were the equipment his property, rather than demanding the services of a repair man which nearly always necessitate expense in the form of travel and lost time, entirely out of proportion to the work actually accomplished. I believe it is safe to say that the depreciation and maintenance of a gasoline pump would be conservatively between $100 to $120 per year which, on a throughput of 6,000 gallons, represents a marketing cost of approximately 2 cents per gallon. Add to this an average rate of quantity discount of approximately 1.4 cents per gallon and it is evident that there is little left out of the average spreads with which to meet the balance of your marketing expenses.

In an effort to squeeze present marketing expense into the spreads available, many marketers quite seriously consider their investments in loaned dispensing equipment as accumulation of assets and account them as capital. I believe this practice is open to question and that there is as much reason to consider a pump installation as current expense as there is to consider it as a capital investment. In this respect, the brewing business, which some of you older men will recall as a once thriving industry in these United States, presents a striking parallel. I believe that my own experience was common to many in the industry in that, having become an ex-brewer by special act of Congress, I found myself the possessor of some $500,000 worth of chattel mortgages, all of which had been properly and religiously recorded from year to year, which covered assets consisting mostly of obsolete cash registers, broken cuspidors and dirty dish towels.

Suggested Remedies

It must be evident that some basic readjustment must take place before the marketing end of the industry will find itself upon a solid foundation. Either spreads between wholesale and retail markets must be increased to absorb these costs, which means increased cost to the public, or this waste and abuse must be eliminated or reduced to a point which will permit our marketing on present spreads and still yield a fair and continuing profit. While the finding of a complete answer to this problem may be some time off, it would seem that, with every responsible marketer recognizing the evil, something could be done towards placing the matter on at least a more ethical basis. Through the good offices of the American Petroleum Institute, some standard practice, recognized by all and to which all could quite properly agree, could be designed to protect our respective interests. For instance, whenever and for whatever reason a given account transferred his affections from one source of supply to another, under some such scheme the retiring marketer, upon presenting clear title and right of removal to the property, could, subject to proper rates of depreciation, look to the incoming marketer for reimbursement for his investment. As part of this scheme and as a beginning towards the complete elimination of the evil, it might be proper to establish the practice of the account in question being obliged to pay for underground tanks, piping and installation charges covering nonremovable equipment.

To sum up "what price free equipment?" we have: (1) the original cost of the equipment, maintenance and cost of withdrawals and transfers, lack of asset value; (2) accessory equipment, air compressors, air stands, driveways, paint and putty, et cetera; (3) unnecessary and wasteful investment due to installing pumps in areas and at points already sufficiently equipped to serve the demand for a given gasoline and consequent reduction of throughput with already established dealers; (4) encouraging the entrance into the business of many undesirables without sense of contract obligation, with increased losses due to bad debts, and dissipation of competitive investment, all tending to keep retail markets in a demoralized condition; and (5) in the final analysis, putting the total bill for wastefulness up to the public to pay.

*Before American Petroleum Institute, Chicago.

Advantages of Vacuum Distillation

Obtain Uniform Heating by Maintenance of High Velocity Over Heating Surface in Pipe Still Installations

By F. A. Howard and N. E. Loomis*

In the distillation of a typical crude oil by methods common in the petroleum industry practically three-fourths of the lubricating oil fractions are destroyed. A yield of 6 per cent to 7 per cent of an oil having a viscosity of 285 at 100 degrees is commonly obtained from Mid-Continent crude. By the vacuum distillation of the same crude 24 per cent of the same viscosity oil is readily obtainable and the yield is only limited by the necessary flash point, since there are obtained fractions of such high viscosity that all of the available gas oil must be blended back to get the average viscosity desired.

While the above quantitative relation was first brought forcibly to our attention by experimental work started in the laboratories of the Standard Oil Co. of New Jersey, approximately nine years ago, the general qualitative advantages of vacuum in the distillation of petroleum products have been recognized for some decades. More than 50 years ago a United States patent was issued to Tweddle in which an increase in yields of wax and lubricating oil by distilling a crude under vacuum was clearly indicated. Despite this knowledge vacuum distillation has been used to only a limited extent, particularly in this country, until the last few years. Abroad, it has received more attention.

There are many reasons for this limited use of vacuum distillation. Crude petroleum has been relatively cheap and there has been little incentive to make the maximum yield of lubricants from it. There is no present market for all of the lubricating oil that could be recovered. In the case of wax-bearing crudes there has been general difficulty in the dewaxing of distillates produced under vacuum; this is particularly true when the distillates are not properly fractionated. Vacuum equipment is more expensive in proportion to its size than that for atmospheric operation and requires better workmanship. It is well known that a small increase in vacuum at high vacua is as effective as a much larger increase at lower vacua. Only within recent years have manufacturers been able to furnish pumps, steam jets, etc., which will satisfactorily and cheaply maintain high vacua on large commercial equipment.

The use of vacuum serves only to reduce the pressure under which an oil is distilling, thereby lowering its boiling point, and preventing thermal decomposition. Given proper equipment practically all the advantages of vacuum distillation can be obtained by the use of steam in the still. To obtain the equivalent of a good vacuum, however, requires the use of large quantities of steam. For an oil having a molecular weight of 400, such as a Mid-Continent distillate of about 25 degrees A.P.I., there is required 10 pounds of steam per gallon of distillate to be equivalent to 1 foot or 25 mm. absolute pressure. Frequently, however, it is advantageous to use some steam and a moderately high vacuum, thereby getting the equivalent of a higher dry vacuum. The use of any steam, however, has the disadvantage of limiting the possible vacuum to the vapor pressure of water at the temperature to which it is cooled in the condensing equipment, unless a booster stage is interposed between the still and the condenser. From what has just been said it is obvious that the use of vacuum may be considered either a substitute for or supplement of steam and it follows that vacuum will be most advantageous where the most steam is used in present operations.

*Before American Petroleum Institute, Chicago.

Boiling Point

The use of wet or dry vacuum in a distillation process may be aided by taking advantage of the lower mean boiling point characteristic of flash separation. In batch distillation or in distillation from a battery of continuous stills, the vaporization of the high boiling fractions is not aided by the presence of the low-boiling fractions and consequently the heavy fractions may be distilled only by raising the oil to the temperature at which the vapor pressure of these fractions equals the total pressure of the system. In the presence of the low boiling fractions the heavy fractions are continuously removed at a lower temperature sufficient only to give a vapor pressure equal to their reduced partial pressure. This is secured when the oil is heated in a pipe still and the mixture of liquid and vapors discharged into a separator where flash distillation occurs under conditions approaching equilibrium. Since vacuum distillation is used only where it is advantageous to maintain a low temperature of distillation and since separation always helps maintain such a low temperature it is surprising that vacuum flash distillation has not attracted more attention. Practically all vacuum equipment now operating is of the batch or continuous still type. This type permits of making cuts somewhat more advantageously than is possible where one must depend solely upon partial condensation with or without rectification. Working with oils of relatively low boiling point it may be entirely feasible to carry out the distillation in more than one stage but to reduce a crude to a minimum residuum for any purpose whatsoever in which cracking is to be prevented, a one stage flash distillation is resirable after taking off from the crude only as much of the light fractions as will interfere with the maintenance of high vacuum.

Following the preliminary work already referred to for ascertaining the mathematical advantage of vacuum distillation, further work to establish the best construction for minimizing the back pressure on a still or separator, and following the operation of a small flash vacuum pipe still, we designed a commercial sized vacuum pipe still battery. This equipment was constructed and started operation as a test unit in January of 1924.

Pipe Still Installation

A brief description of what we believe was one of the earliest large scale vacuum pipe still installations may be of interest. Originally the equipment was intended to rerun pressed oil for production of pale and red oils, and since at least two overhead fractions were desired and since these are relatively low boiling distillates, the equipment was designed for two-stage operation. After preliminary heating and partial reduction the feed stock was pumped through a pipe still at the rate of 3,000 gallons an hour and delivered into a vertical 10 by 30-foot separator. From the bottom of this separator the residuum was drawn off to another pipe still in which the oil was further heated and delivered to a second separator.

Unvaporized oil was drawn off from the bottom of the second separator. Cooling coils were installed in the upper portion of each separator, the condensate from each group of coils refluxing into a pan from which it was pumped through cooling equipment. Provision was made for installation of bell-cap plates below the pan when and if required. Steam connections were provided so that steam could be introduced into either the coils or the bottoms of the two separators. Large vapor lines connected the top of each separator to a common barometric condenser to which in turn was connected a vacuum pump.

Since installation this battery has been used for a large amount of experimental work, principally on West Columbian, Peruvian and Colombian crudes. It has been used for both one-stage and two-stage flash vacuum operation with both wet and dry vacuum, and for both overhead and residual products. Numerous difficulties have been encountered. The method of introducing the oil from the pipe still into the separator so as to prevent or minimize entrainment is important. Sudden expansion sometimes results in a mist that it is very difficult to remove. Trouble was experienced with fogging around the cooling coils in the top of the separator, resulting in much oil being carried over to the barometric condenser, even when the temperature at the top of the separator was kept low. This was corrected by avoiding sudden or shock cooling, such as is obtained by having a large temperature differential between the vapors and cooling medium. Considerable work has been done on the proper design of bell-caps to minimize the pressure drop when rectification is desired. Much work has been done on permissible vapor velocities through the tower. As a result of these studies we now believe it possible to design and efficiently operate such flash vacuum equipment.

Most of these advantages are shared by any other vacuum process and we have had some opportunity of comparing the results obtained by this pipe still installation with those of the ordinary vacuum shell still installation. To a great extent the advantages peculiar to vacuum pipe still equipment are those generally claimed for pipe stills operating at atmospheric pressure. Of special importance, however, with such stocks as we would process in vacuum pipe stills, are the advantages of uniform heating by maintenance of high velocity over the heating surface, of reduced time during which the oil is subjected to heat, and particularly the advantage of lower temperature due to flash distillation.

Pipe still operation has made rapid progress in recent years. For the production of high viscosity distillates or heavy residues it is not only theoretically but practically advantageous to supplement pipe-still operation with vacuum separation of products.

EDUCATING DRIVER IMPORTANT FACTOR IN HANDLING TRUCKS

By Roy F. Fike*
Mid-Continent Petroleum Corp.

To tackle this assignment is like diving down into the ocean and tackling an octopus, with its many arms, all about of the same strength and importance, open to receive you and all of them leading to the main body or issue. Every man who has had the formation of a motor vehicle department placed in his charge, now understands just what a responsibility he tackled; especially if it was composed of cars and trucks of all sizes as well as tractors and other automotive equipment scattered over the country and previously operated and controlled by numerous department heads, each operated after his own plan and no two alike. This, however, is generally the condition and it is due to this condition, that you were called into the picture; like others, we found our problems to be of this general type.

The handling of trucks, from a fundamental standpoint, is no different than the handling of cars or other equipment and what I have to say hereafter will have to deal with the whole subject rather than any particular unit. I must talk from the practical viewpoint rather than the technical, as my activities have brought me in contact with practical operations rather than technical.

A number of companies represented here have many more pieces of equipment than have we. This does not change the basic principles of operation whether there are few or thousands. Every business, and unit of a department, has the same basic principles and according to our thought they come in the following order:

1. The analysis of the job.
2. The plan of its operation.
3. The organization of the work.
4. The handling of the help.
5. The conserving and caring for the records.

Take the small shack or the immense steel structure, the peanut business or the largest industrial plant, the same fundamentals hold good if that business is successful. This is proven by the fact that a number of our largest merchants and industrial institutions have grown from the shack or peanut business. The Chinaman, negro, Indian, or other races, are identical under the skin. All have the same vital organs and the human, like the business, differs only in the way you dress it, rather than as to the underlying principles.

The automobile and truck manufacturers of today are the survival of the fittest, as public opinion has sat in the judge's chair for the past 25 years and watched some 550 makes and makers disappear, the 50 remaining have passed the board of censorship and to my way of thinking, are all good. I believe the manufacturers are doing their part better than we, as, when we show them their weaknesses, they set about to correct them. They have their engineers working all the time on improvements, tests are constantly taking place, and still we are not doing our part. This is applicable to most operators of equipment fleets.

The one outstanding, universal need, as I see it, is the development of the "man behind the wheel." No manufacturer of cars or trucks can survive who does not build a good motor. Every car needs two motors, according to my belief; namely, a mechanical motor and a human motor, one developing "horsepower," the other "horse sense." We are all criticising the manufacturers, when we look behind the steering wheel instead of under the hood, we find our greatest expense and difficulties. Who of you have not seen carelessness and abuse in every small town or city you have visited, by some grocery, laundry, bakery, or other business delivery wagon boy who did not care? How much greater must be our abuses and losses on our expensive equipment, out in the oil fields

(Continued on Page 118)

*Before American Petroleum Institute, Chicago.

Value of Gas in Petroleum Production

Best Means for Its Most Efficient Utilization Most Important Factors in Flow of Oil

By W. P. Haseman*
Marland Oil Co.

An unexplored oil field is essentially a defined underground reservoir consisting of a porous formation and containing a fluid mixture of hydrocarbon liquids, vapors and gases under certain conditions. The reservoir left intact contains the fluids either as a liquid with the vapors and gases held in solution by pressure or as a homogeneous or heterogeneous mixture of the liquids, vapors and gases under pressure and with varying chemical and physical properties. The fluids are confined and held under pressure, with the gases often segregated largely in the structurally high part of the reservoir. The porous formation inside the reservoir is made up of discrete particles of quartz sand, limestone, or other materials, which are irregular in size and shape, and more or less tightly cemented with varying materials. As a result the pore openings are also very irregular in size and shape, and form winding channels through which the fluid mixture must pass.

A knowledge of the characteristics of the conditions existing in the reservoir, which influence the production of petroleum and gas, is of prime importance. They may be grouped as follows:

A. Uncontrollable characteristic conditions:

1. Structural.
2. Bedding and lenticularity.
3. Character and extent of cementation.
4. Grain size, shape and arrangement.
5. Porosity and pore space.
6. Extent and character of fractures and fissures.
7. Character of sedimentation.
8. Physiography at the time of deposition of reservoir formation.
9. Presence and character of bottom and edge water.
10. Depth to and thickness of reservoir.
11. Static gas-oil ratio.
12. Reservoir temperature.
13. Permeability.

B. Partially controllable characteristic conditions:

1. Gas pressure.
2. Hydrostatic pressure.
3. Viscosity.
4. Capillarity.
5. Adhesion.
6. Surface tension.
7. Dissolved and occluded gases.
8. Expansion of vapors and gases.
9. Gas-oil ratio (flow).
10. Temperature (flow).
11. Specific gravity.

Knowledge of Conditions Important

It is important to have a knowledge of these uncontrollable characteristic conditions in order better to handle the engineering problems connected with the field development and the application of pressure control methods to the production of the petroleum and gas; on the other hand, a knowledge of the partially controllable conditions will directly contribute to a more efficient and increased ultimate production as well as aid in the better handling of the engineering problems. These partially controllable characteristic conditions can best be regulated through the employment of natural gas which is found intimately associated with the petroleum in the natural reservoir. Thus natural gas has a great value in the conservation and economic production of petroleum.

This paper enlarges on this value of natural gas. The subject matter is divided into two parts; namely—

1. The importance of natural gas in the production of petroleum.
2. The best means for its most efficient utilization.

Part 1—The importance of natural gas.

Natural gas is important in the production of petroleum because—

A. It dissolves in petroleum when under pressure and thus alters the fluidity favorably for the extraction from the reservoir.

B. It contains stored energy when dissolved in petroleum and also when compressed, and thereby becomes the prime "motive force" for the extraction of petroleum from the reservoir.

A. Solubility and the effects of natural gas in petroleum.

The solubility of gases in liquids is a very familiar phenomenon that is governed by well-known scientific principles. The solubility and the effects of natural gas dissolved in petroleum at various pressures and temperatures have been determined experimentally. Provided other conditions remain constant, the results of these experiments may be summarized as follows:

(1) Quantity of natural gas that will dissolve in petroleum depends upon the character of the petroleum and the gas;

(2) Quantity of natural gas that will dissolve in petroleum depends upon the temperature;

(3) Quantity of natural gas that will dissolve in petroleum is proportional to the gas pressure;

(4) Decrease of viscosity depends upon the quantity of natural gas dissolved in the petroleum;

(5) Decrease in surface tension depends upon the quantity of natural gas dissolved in the petroleum;

(6) Increase in A.P.I. gravity or decrease in specific gravity depends upon the quantity of natural gas dissolved in the petroleum.

Most Important Factors

Viscosity, surface tension and specific gravity of petroleum are the most important factors in the flow of petroleum through pipes and porous formation. Other conditions remaining constant, a reduction in the magnitude of them indicates increased interval (daily) and cumulative (ultimate) production of petroleum from a reservoir.

The experimental procedure and data on the solubility of natural gas in petroleum and its effects on the viscosity, surface tension and gravity of petroleum may be found in the papers listed below.

1. D. B. Dow and L. P. Calkin, United States Bureau of Mines, Serial No. 2,732, February, 1926.

2. C. E. Beecher and I. P. Parkhurst, "Petroleum Development and Technology for 1926," Page 61. A. I. M. M. E.

3. D. B. Dow and C. E. Reistle, Mining and Metallurgy, Vol. 5, pp. 36-337, July, 1924.

B. Energy stored when natural gas is dissolved in petroleum or confined in a reservoir under pressure.

Natural gas in an undisturbed natural petroleum reservoir is present in two forms—in the gaseous phase above or separated from the petroleum, and as dissolved gas in the liquid phase throughout the petroleum. Both forms must be reckoned with in the study and efficient application of production technique and methods. When a well penetrates a reservoir, petroleum and gas begin to flow through the formation toward the well at a point of released pressure. This flow is accompanied by a progressive pressure drop as the fluid acquires increased velocity and friction in the formation is overcome.

An alteration in the pressure confining natural gas in a petroleum reservoir will alter the natural gas present in both phases. When the pressure is increased the natural gas will be compressed and part of it will change into the liquid phase. This altered condition results in energy being stored in the fluids because work must be done to bring about the changed condition. On the other hand, when the pressure confining the gas in the petroleum reservoir is decreased, that in the gaseous phase will expand and that in the liquid phase will come out of the petroleum. As the phase is changed, the volume of the gas will increase many times. This altered condition results in a liberation of energy, and work is done by the expanding gas in increasing the velocity of the fluids and overcoming friction in the formation as the fluids flow toward the well. The quantity of energy stored in any given volume of the petroleum reservoir depends upon the quantity and the nature of the component parts of the petroleum fluids present, their temperature and their pressure.

This stored energy in a petroleum reservoir as a result of pressure on the natural gas is of paramount importance in most oil fields in the natural production of petroleum. It is through this energy that natural gas becomes the prime "motive force" which moves the petroleum fluids through the reservoir formation into and out of the well by natural flow. It is analogous to that stored in the water, steam and air in a heated boiler. In fact, the reservoir with its petroleum liquid, hydrocarbon vapors and gases may be in every respect likened to a heated boiler filled with water, steam and air. It is a familiar fact that as the reservoir boiler is heated, the temperature of the water is raised and steam is formed with a resulting increase of pressure in the contained water, steam and air. This increase of pressure indicates that an increased amount of energy is stored in the fluids. Similarly, there is energy stored in the petroleum fields contained in a natural reservoir. The reservoir has a fixed earth temperature determined largely by its depth. It is above the boiling point of several of the hydrocarbons which constitute a part of the liquid volume contained in the reservoir. In addition the hydrocarbon vapors and gases existing as such in the reservoir are compressed.

Principle Familiar

It is well known that in case a boiler containing water, steam and air at a high pressure and at a temperature considerably above boiling water were tapped by drilling a small hole through the top, some of the air and steam would be expelled with very little, if any, of the water as liquid. However, if the opening were large the air and steam would be expelled with such violence and in such quantities as to approach an explosion, and in that event considerable water might be expelled. Again, if the boiler were packed with sand and the pore space filled with water, steam and air, the outflow, when tapped, would then be quite analogous to the flow of petroleum, hydrocarbon vapors and gases from the reservoir into the well. It would appear that in case the bore of a well that taps the petroleum reservoir were sufficiently small to restrict the more or less free flow of the petroleum fluids into the well, the natural flow would be largely vapors and gases which distill from and move through the petroleum liquids in such form and with such velocity to the well as not to trap and expel an appreciable quantity of petroleum. Should the bore of the well become large enough, the wells drilled sufficiently close to each other, and all were opened to flow simultaneously, the expulsion would approximate an explosion and the greatest possible amount of the petroleum would be expelled. In this instance, the reservoir conditions are, of course, assumed to be homogeneous particularly with reference to the conditions affecting those factors which control the rate of flow of petroleum.

The problem of the flow of the petroleum fluids through the reservoir formation is considered very difficult to formulate and more difficult to solve. Notwithstanding this, if an oil well be considered as a source of potential energy, hypothetical problems can be formulated and solutions secured that represent the observed facts very well.

To get a qualitative picture of the flow of the petroleum fluids through a natural reservoir, let it be assumed that the reservoir formation consists of three sections, each with a definite but different permeability, so that in the uppermost section under the existing conditions the contained fluids would move toward the well with a velocity V1; the central section supports a velocity V2; the lowest section, a velocity V3. It is further assumed that the central section is the most permeable, the uppermost next and the lowest least permeable, so that V2 is greater than V1, and V1 is greater than V3. Let it be assumed that initially the undisturbed reservoir had a fluid with sonstant gas-oil ratio throughout.

Now suppose that a well is drilled into the reservoir and a movement of the fluids starts toward the well with a progressive drop in pressure. Since the speed through the central section is considerably greater than through the upper and lower sections, the corresponding pressure drop in the three sections will tend to be different with the greatest in the central section. The condition can not exist if any fluid, particularly gas and vapor, can distill across from the boundary of one section to another in appreciable quantities. The result is that gases and vapors in the uppermost and lowest sections will continually distill across into the central section, thus materially increasing its gas-oil ratio. The case may be further simplified for discussion by assuming that the permeabilities of the uppermost and lowest sections are such as to prevent the flow of petroleum fluids, particularly the liquids, through the sections to the well. This will limit the petroleum production to the central section only and might represent actual conditions in the late life of a well. Thus it is seen as the petroleum in the central section is moved along toward the well, vapors and gases will be added to it from the other sections. Obviously, the petroleum farthest from the well will, as it flows to the well, receive more gas and vapor than an equal amount closer to the well. The gas-oil ratio of the petroleum production will, therefore, increase with the life of a well.

Results Similar

In principle the same result will take place in a fairly homogeneous reservoir formation since certain of the winding pore openings as channels have on an average larger and more uniform cross section than the majority of the channels. These larger and more uniform ones will carry a fluid with a greater gas-oil ratio than the other channels. This ratio will be augmented with time by distillation from neighboring channels. Natural gas is endeavoring to escape from the reservoir in such a way as to reduce the exergy stored in the reservoir to a minimum without storing up or transferring any part of it to matter in another position or phase. The natural gas, therefore, attempts to clear those larger and more uniform pore channels of petroleum, which, when cleared, will permit the free egress of the residual natural gas from the formation to and out of the well, leaving a maximum of the petroleum in the reservoir. This would indicate that the petroleum production from a reservoir should peak before the gas production,

*Before American Petroleum Institute, Chicago.

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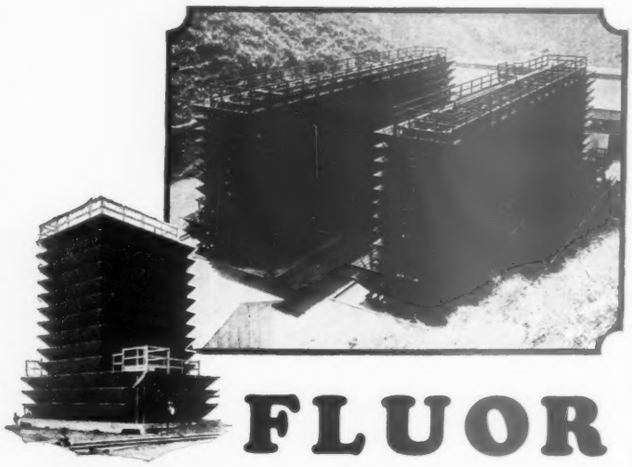

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provided the gas is moving the oil ahead of it in order to clear certain passageway channels through which it may later escape. This accords with a fundamental scientific energy principle, and to fulfill it under the existing reservoir conditions the gas-oil ratio must increase as the petroleum production declines. Accordingly, a retardation in the speed of the free flow in the larger and more uniform pore channels relative to that in the other neighboring channels would reduce the rate of distillation into the larger channels and therefore reduce the gas-oil ratio until a minimum condition is reached.

The data which indicate that natural gas is the prime "motive force" in the natural production of petroleum are for the most part gas and petroleum production data taken simultaneously for a field, a lease and an individual well. In general, it will be noted that the petroleum and gas production decline together and are accompanied by a decline of pressure, which means a loss of energy to the reservoir.

Gas Prime Motive Force

The fact that the gas production from a reservoir peaks or tends to peak later than the petroleum production and then for a period declines faster than the petroleum production indicates that the natural gas is the prime "motive force." The increase of gasoline content with the decline of production would indicate that the energy of the hydrocarbon vapors, together with gravity drainage, assists in maintaining the petroleum production.

Part 2—The best means for the utilization of natural gas.

The most efficient and economic utilization of natural gas in the production of petroleum will be attained when in production practice that control method is applied to the individual producing well which will result in the following:

A. The retention of the natural fluidity and energy in the reservoir fluids to the greatest extent possible, consistent with scientific and economic conditions, during the period of natural production of a field, lease or individual well.

B. The restoration of the depleted fluidity and energy in the reservoir reserve fluids to the greatest extent possible, consistent with scientific and economic conditions, during the period of artificial production of a field, lease or individual well.

This statement is based upon the fundamental principle, that provided other conditions remain constant, the most efficient and economic interval daily) and cumulative (ultimate) production of petroleum will be had from a well when the fluidity and energy factors of the reservoir are kept most favorable to the production of petroleum, and it would appear to be axiomatic. Again it is well-known that any source of energy must be under control if efficiency is to be realized in any specified application of this energy. An oil well, as a source of potential energy, can be no exception to this rule.

A. Retention of fluidity and energy in the petroleum reservoir.

The retention of the fluidity and energy in the petroleum reservoir that has been tapped implies necessarily that a pressure control method must be employed. In production practice this is done by altering the flow stream in such a way as to alter the fluid pressure in the well on the exposed face of the reservoir formation by any of the following methods or a combination of them:

(a) Flow bean.
(b) Flow tubing.
(c) Air-gas lift.
(d) Stop-cocking.
(e) Pressure maintenance.

Conform to Universal Law

These methods are generally well understood with respect to their qualitative application to production practice. They represent scientific and engineering developments and necessarily must conform to the universal law governing such. They are evolutionary in nature and must and will ever be changing through development if progress is to be assured. Their application has given results to justify the conclusions given hereinafter.

Table 1 in the appendix gives data before and after pressure control was applied to production, and shows the advantages that are claimed for proper pressure control over improper or no control.

(a) Flow bean method.

The flow bean has been the most widely adopted of the pressure control methods and to date is generally accepted as a commercial method of wide application. It is a restricted opening in a steel nipple that is placed in the flow line generally close to the well head and upstream from the oil and gas separator. It has also been used at the bottom of the flow line, but because of the difficulty of placing it, it is rarely used at this point.

The size of opening to be used to obtain the most efficient control from this method is determined by preliminary trial with beans of different sizes. As the well declines adjustments are made in the size to compensate for the changes in the flowing conditions of the well.

This method of control has its greatest value in the initial period of a well when the flush production is large. It also has a great potential value in connection with the other control methods mentioned hereafter.

When properly and efficiently applied, the following claims for the flow bean method of control are made:

1. Gas-oil ratio can be held at a minimum or other controlled value with slight, if any, reduction in daily petroleum production.
2. Petroleum decline steadied with increase in ultimate indicated.
3. Decreased lifting costs.
4. Retards water encroachment.

(b) Flow tubing method.

The usual method in the initial period of production is to flow a well through the casing. This permits the well to make as much petroleum and gas as it possibly can, and as a result the gas volume and reservoir pressure are soon depleted. The well must then be agitated, swabbed or shot in order to stimulate and sustain the flow.

It is becoming common practice to tube the well early in its life by lowering into the casing a flow string of tubing. The space between the casing and tubing may be packed off at the lower end of the tubing; however, if the well is cased down to the petroleum reservoir the packer may be placed at the casing head. Since the tubing is smaller in size than the casing it gives restricted or, in a measure, controlled flow.

Essential Factors

It is recognized that the size and shape of flow string and the depth to which it is run are factors essential to the most efficient flowing of a well, and that as the flow conditions change with the decline of production, the flow string should be altered. This method of control is generally applied before a well begins to flow by heads, but since it is essentially a series of flow beans, it should apply equally well throughout the flow period of a well. It appears that the flow tubing might be preferable to the flow bean since the resistance offered to the fluid is more uniformly distributed throughout the stream.

When the flow tubing method of control is properly and efficiently applied, the following claims are made for it:

1. Reduces gas-oil ratio.
2. Steadies the petroleum decline with increase in ultimate indicated.

Data indicate that gas-oil ratio, by flowing through 2-inch or 2½-inch tubing properly set, can be easily reduced from 1,500 cubic feet per barrel in 6⅝-inch casing to 500 cubic feet per barrel, with no appreciable effect on daily petroleum production. Data also indicate that wells should be tubed as early in their flowing life as conditions and tests justify, and that further altered conditions in the flow stream be brought about by the application of the flow bean or air-gas lift, or a combination of both of them.

(c) Air-gas lift method.

The air-gas lift is primarily a method of mechanically altering the fluid pressure on the face of the reservoir formation and simultaneously altering the fluidity, specific gravity and the energy in

(Continued on Page 139)

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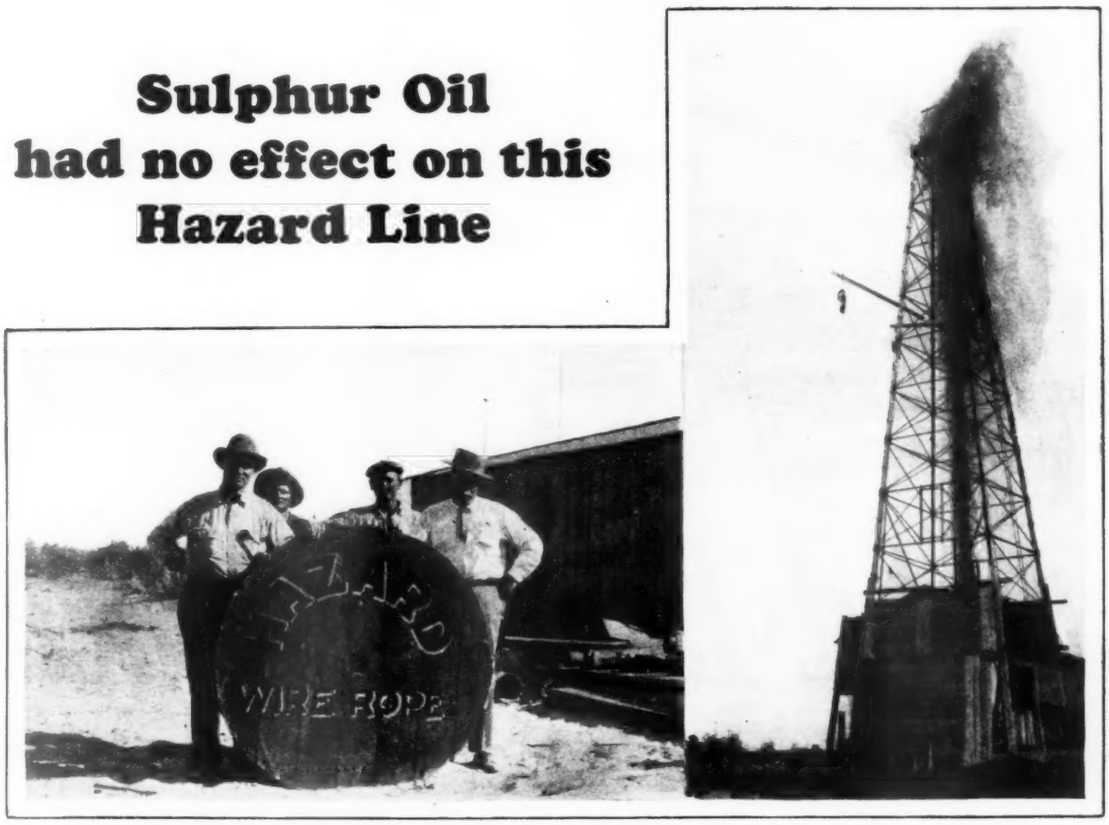

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THE PRESCOTT COMPANY

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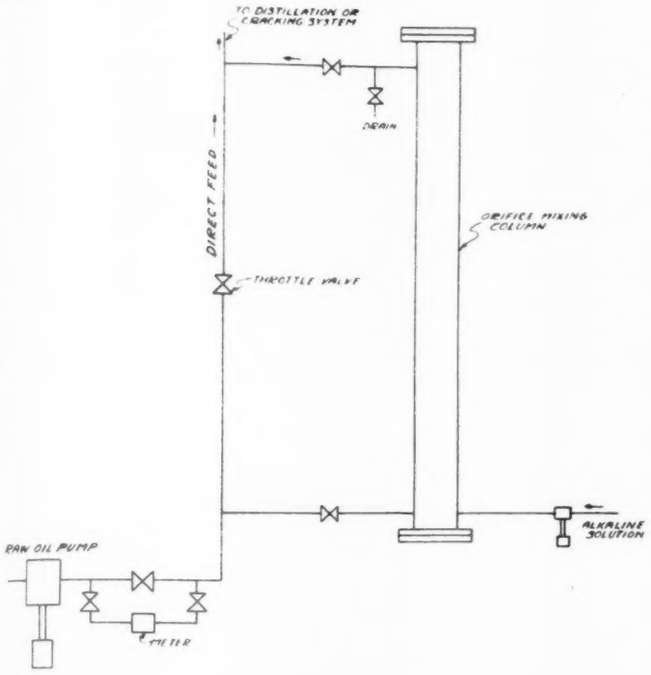
Pumps for deep mines ~ Pumps for pipe lines

CHEMICAL REAGENTS IN CORROSION PROBLEM

(Continued from Page 80)

pounds. Using 10 plates, the pressure is 1 pound per plate. For the average fuel oil of specific gravity 0.9, this pressure



MIXING SYSTEM IN CORROSION PROTECTION UNIT
FIG. 4

No. 4—Mixing system in corrosion protection unit.

is equivalent to a head of 2.55 feet per pound, calculated from the formula:

$$Q = ca\sqrt{2gh}$$

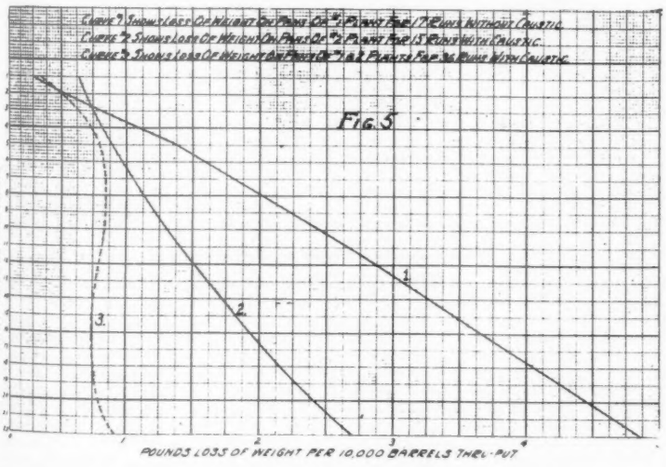
Where:
Q=flow in cubic feet per second.
c=discharge coefficient=0.65.
a=area of orifice in square feet.
g=gravity acceleration=32.2 feet per second.

At 1,100 bbls. per day, or 46 bbls. per hour, the total orifice area per plate would be 1.33 square inches equivalent to the total area of three one-half-inch diameter holes equally spaced on the plate as shown in drawing No. 2, when allowing an all around clearance for the plate of one-sixteenth inch, which is equivalent to a clearance of 0.736 square inches.

Construction of Mixing Column

The full details of the construction of the orifice column are shown in Figure No. 2. A 7-foot length of 4-inch extra-heavy pipe is used. The plates are welded to the rod as shown.

A combined mixing and storage tank is used for the reagents. Figure No. 3 shows the arrangement of a storage tank with small feed tanks attached for six cracking units, each converting 1,100 bbls. of oil per day into more than 50 per cent of gasoline. The feed tanks are connected in series with the storage tank by a centrifugal pump and are filled by manipulating the valve positioned at the feed tank. Each unit is fed from a separate feed tank connected as shown in Figure No. 3. The reagent is drawn from the feed tank by means of a small plunger pump or reciprocating pump and fed into the orifice mixing column.


CURVE 1 SHOWS LOSS OF WEIGHT ON PLATE OF 1 PLATE FOR 7 RUNS WITHOUT CAUSTIC
CURVE 2 SHOWS LOSS OF WEIGHT ON PLATE OF 2 PLATE FOR 15 RUNS WITH CAUSTIC
CURVE 3 SHOWS LOSS OF WEIGHT ON PLATE OF 1 & 2 PLATES FOR 36 RUNS WITH CAUSTIC
FIG. 5
1
2
3
POUNDS LOSS OF WEIGHT PER 10,000 BARRELS THRU-PUT

No. 5—Curves showing relative loss of weight of Armco iron dephlegmator pans with and without addition of caustic soda to charging stock on a basis of barrels throughput.

Arrangement and Operation

The 2-bbl. feed tanks are located at convenient points. The orifice column may be located anywhere near the plant, preferably along the outer wall of the receiver house. The arrangement of the lines to and from the orifice column is shown in Figure No. 3. The oil is charged by means of the raw oil pump

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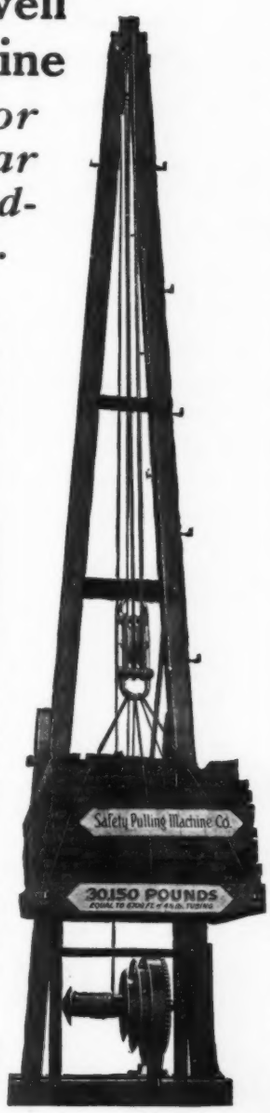
The whole reel assembly is mounted on 2¾ square steel shaft extending clear through reel, secured by three heavy castings.



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having a meter and bypass, with a throttle valve between the charging line which leads directly to the dephlegmator and the orifice column. Another valve interposed between the throttle valve and the orifice column permits bypassing of the latter, when desired. The reagent is fed in with the pump, and, together with the oil, enters into the top of the orifice column and is discharged at the bottom to the charging line of the distillation system, entering the dephlegmator or other points where it is found desirable to feed the chemical solution.

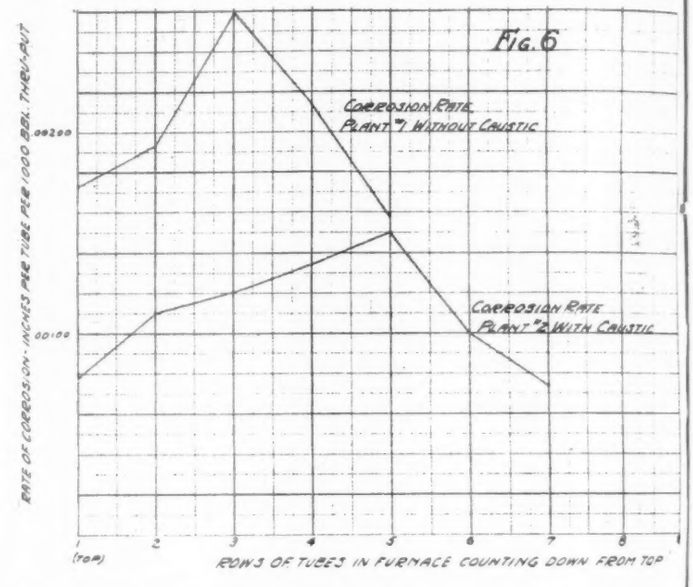
Figure No. 4 shows a similar arrangement, excepting that the alkali and oil enter the bottom of the orifice column and are discharged from the top. It is believed that the arrangement shown in Figure No. 3 is more satisfactory. The oil and alkaline solution thoroughly mixed are fed into the dephlegmator.

As stated previously, only a portion of the oil need be passed through the mixing column, and the mixture of oil and reagent then fed into the main stream of the oil. Under these conditions the orifice column must be designed for the smaller quantity of total liquid passing through, keeping the pressure factor the same. The lines for carrying the bypassed oil should be 1-inch extra-heavy pipe. The connection into the raw oil line can be made with tees and a valve should be placed directly after the tees so that the whole injection system can be closed off when desirable. If a plunger pump is used, it may be operated separately by motor or may be attached to the rocker arm of the oil feed pump. The chemical reagent line leading to the raw oil bypass is connected as shown in the drawing. A tee with petcock should be installed directly after the orifice mixer so that samples can be taken from time to time to determine the degree of mixing.

Caustic Soda Injection

The caustic soda solution is made approximately of a gravity of 10 degrees Baume and is injected in the proportions of 0.2 to 0.3 per cent of the oil, by volume. In the use of caustic soda, some difficulty has been observed in the deposition of the solid reagent or the reaction product, sodium sulfide, upon various parts of the heated system with resulting high rate of corrosion due to the protecting reagent itself. This difficulty is offset to a considerable extent by the use of the mixing system heretofore described, or by injecting the caustic soda solution in a more advantageous part of the distillation apparatus.

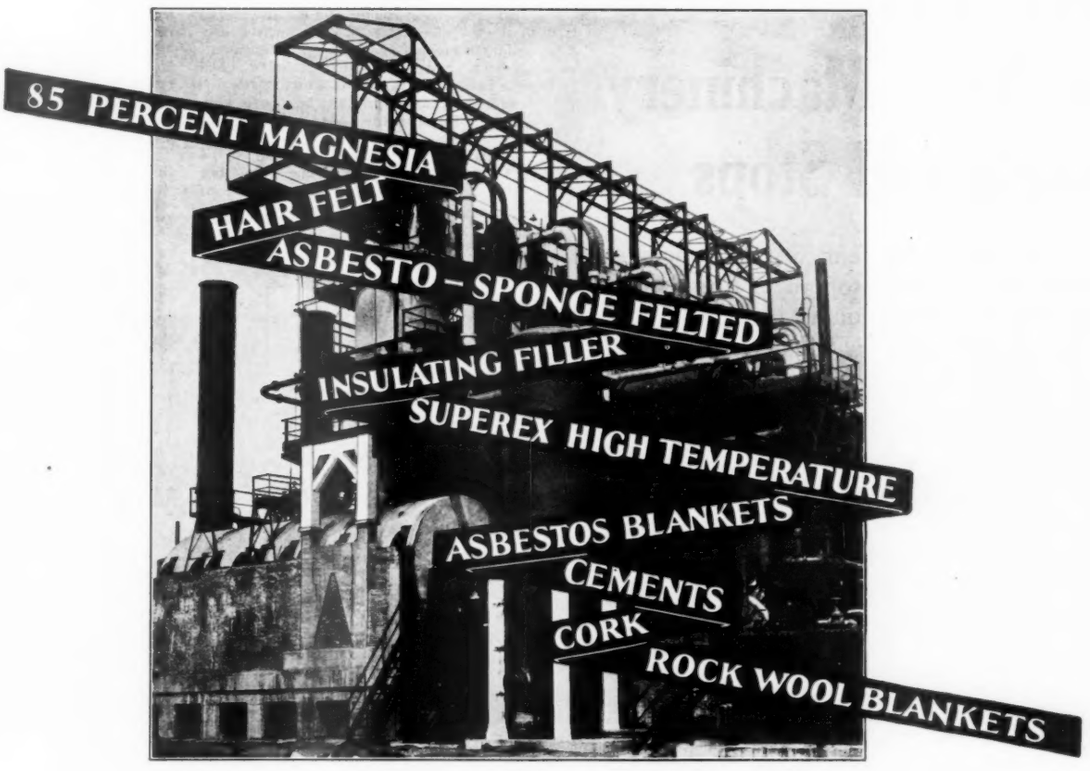
Another difficulty presents itself in the use of caustic soda; namely, the deposition of coke in the heating tubes is increased to a considerable extent. On the other hand, caustic soda has been known to give satisfactory protection when relatively small amounts have been used. The accompanying diagram, Figure No. 5, indicates the results obtained when caustic soda solution is injected into the dephlegmator of a cracking unit. The graph is self explanatory and shows that the corrosion was cut down to approximately 50 per cent when compared to an operation using no chemical. In one commercial plant it has been reported that the coke deposition was cut down 80 per cent in the heating tubes by the injection of caustic soda in regulated quantities. Figures Nos. 6 and 7 indicate the rate of corrosion of the heating tubes in a cracking unit.



No. 6 and 7—Data on tube corrosion as affected by caustic injection.

One method of determining the rate of corrosion is to place control samples of steel in various parts of the distillation system. These samples are weighed initially and are weighed again at definite intervals, e.g., every month, to determine the loss. From the loss of weight and the area of exposure, the rate of corrosion can be calculated. Steel samples 10 inches by 10 inches by one-fourth inch machined smoothly, and with a hole near one corner for suspending them are suitable. The sample should be suspended with nichrome or similar wire which does not corrode under the conditions of the test. On removing the samples they should be carefully cleaned before weighing. The rate of corrosion as obtained over monthly periods may be plotted and used as a control of the amount of chemical to use.

Soda ash (sodium carbonate) causes



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less deposition of coke than caustic soda. It is cheaper than caustic soda per unit alkali content.

It is injected in a similar manner to caustic soda. The solution is made approximately 10 degrees Baume, and the proportion required is approximately 25 per cent more by weight than for caustic soda.

Lime Injection

In order to overcome the disadvantages of the use of caustic solution, such as secondary corrosion or caustic embrittlement, or both, and the formation of a hard coke in the heating tubes which gives difficulty in removing, lime has been substituted for caustic soda with marked success.

It has been found that the use of 0.4 to 1 pound of hydrated chemical lime per barrel of raw oil charging stock will be satisfactory for most corrosive oils; less can be used with better charging stocks. The exact amount to be used is a matter of experiment for each oil undergoing distillation.

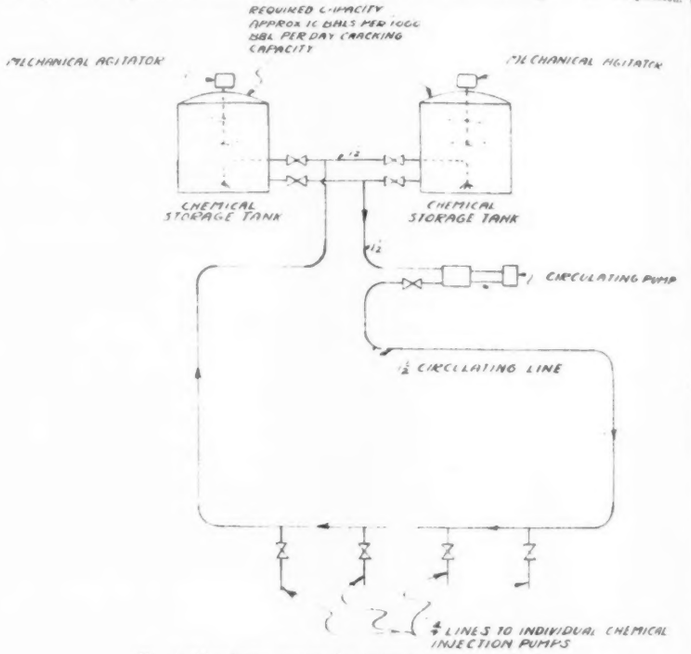
It is recommended that dry "chemical" hydrated lime of approximately 200 mesh be used. The hydrated lime may be added to a portion of the charging stock and mechanically agitated so that it remains suspended in the oil.

The lime is injected at the same point of the cracking system as in the caustic soda method already described. Preferably a tank should be provided to hold a full 24-hour supply of lime suspension. This would amount to approximately 10 bbls. of lime suspension per 1,000 bbls. of cracking capacity. It is advantageous to provide duplicate tanks so that the lime can be mixed in one while the other is in use. It is also advisable to provide a mechanical mixer to keep the lime stirred and maintained in a state of suspension. Where the tank is placed outdoors, a steam coil should be provided to warm the contents in cold weather.

Pumps and Circulating Line

Figure No. 8 shows an arrangement of tank and the circulating line which carries the lime solution to the injection pumps on all units. A 4½-inch by 2¾-inch by 4-inch or 6-inch by 4-inch by 6-inch reciprocating pump with all-iron fittings may be used for this service. Up to a capacity of four 1,000-bbl. cracking units the circulating line may be 1½-inch. For greater cracking capacity the 6-inch by 4-inch by 6-inch pump and a 2-inch circulating line should be used. The return line may be taken to the center of the mixing tank and pointed downward.

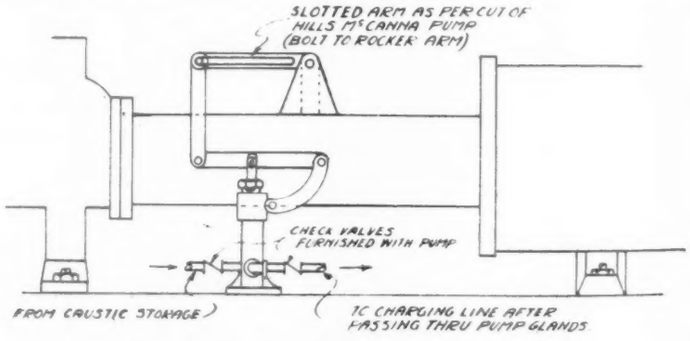
This provision assists in agitating the lime and maintaining it in suspension.


REQUIRED CAPACITY APPROX 10 BBLS PER 1000 BBL PER DAY CRACKING CAPACITY
MECHANICAL AGITATOR
MECHANICAL AGITATOR
CHEMICAL STORAGE TANK
CHEMICAL STORAGE TANK
CIRCULATING PUMP
CIRCULATING LINE
LINES TO INDIVIDUAL CHEMICAL INJECTION PUMPS

No. 8—Circulation system for injection of chemical line.

A flow of 10 to 20 g.p.m. through the line will keep it clear and prevent settling.

An injection pump should be used for each unit; however, a single pump may be used for a battery of units. Where a separate reciprocating pump is used for the raw oil feed of each unit, this injection pump can be operated directly from the feed pump. This arrangement has been found to give satisfactory results.


SLOTTED ARM AS PER CUT OF HILLS McCANNA PUMP (BOLT TO ROCKER ARM)
CHECK VALVES FURNISHED WITH PUMP
FROM CAUSTIC STORAGE
TO CHARGING LINE AFTER PASSING THRU PUMP GLANDS

No. 9—Arrangement of recirculation and injection pumps.

The reciprocating motion required is obtained by fastening the slotted arm of the injection pump directly to the rocker arm of the raw oil pump. The rate of injection can then be controlled by moving the link along the slot. This arrangement is shown in Figure No. 9.

Motor-driven pumps may be also be used to give a constant rate of flow.

Advantages of Lime

Some of the advantages resulting from the use of lime follow:

1. The heating tubes are more easily

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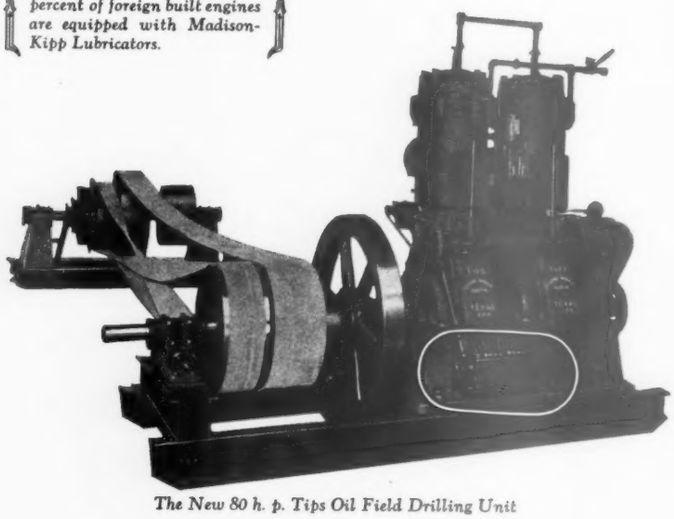

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So long as the engine or pump equipped with Madison-Kipp Lubricators runs, the Madison-Kipp *keeps it properly lubricated.*

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Madison-Kipp Lubricators are flexible in size, oil feed adjustment, type and drive location. They can be readily applied to any engine, pump or compressor in the field. They are built with the ruggedness necessary to stand up to oil field work for *long periods* of time *without repair.*

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cleaned as the lime apparently yields a protective covering between the steel and coke preventing its close adherence.

2. The structure of the coke in the reaction chamber is improved so that a smaller amount of fines or breeze is produced in cleanouts and in handling. The coke is more readily broken up in the chamber.

3. The cost of operation will be less than when using caustic soda due to the lower cost of the lime.

4. Corrosion is decreased materially.

A further and important advantage in the use of lime has been noted in connection with the cracking operation in which the residuum is flashed: The coke formed in the reaction chamber when no lime was used was so dense and hard that it was difficult to remove. By the use of lime as a protecting agent against corrosion, or for the sole purpose of reducing the breaking strength of the coke, this operating difficulty has been overcome.

The following tabulation shows the analyses of the coke produced by a cracking unit when lime is charged into the system and when it is not charged.

Quantity lime used—	0.4 Lbs. per Bbls. of Oil Charged	None
Proximate analysis:		
Moisture	2.73	3.23
Volatile matter	11.85	13.28
Fixed carbon	78.71	81.94
Ash (inclusive of lime)	6.71	1.55
Lime	3.97	...
Sulphur	1.23	0.77
B.t.u.	14,252	15,219

In the runs in which no lime was used, the removal of coke from the chamber presented a real problem. The use of lime permitted easy removal of the coke and did not affect its fuel value greatly owing to the increased ash.

KENTUCKY-TENNESSEE

(Continued from Page 58)

the United Carbon Black Co. has a nice gas well at a second test on the Frank Gearhart farm.

Western Kentucky

Just at this time the vicinity of the well on the W. G. Hayden 165 acres, in the southern part of Daviess County, and about 2½ miles north of the Ohio County line and about 6 miles from the Dimmick Brothers' well on the Ratliff lease, is the busiest area of the western division of Kentucky so far as leasing activity and sale of leases are concerned, with prospects of a rich pool of deeper sand crude.

Dell Salmon with 173 acres and R. H. Nelly farm with 173 acres, 1½ miles northwest of the W. G. Hayden well, leased their lands at $15 per acre bonus, with an agreement to start wells on each within 90 days from the date of the leases. The leases were purchased by the Cumberland Petroleum Co., which recently entered the field after many years of operations in the Weir sand field of eastern Kentucky where the company owns extensive holdings. Mayor John C. Beck of Owensboro, sold a lease on his 120-acre farm, in the vicinity of the Hayden well for $18 per acre, for a total of $2,160 and a well to be drilled within 60 days, the lease being on an eighth royalty. A one-half interest and a one-eighth royalty on one of the farms in the Hayden vicinity sold for $10,000. The bonus prices around the Hayden well are something out of the ordinary for the Kentucky area, although some large prices prevailed in the Ambrose Pool in Ohio County, as well as in the Sunnydale Field of the same county.

The Cumberland Petroleum Co. will start wells on the R. H. Neely and Dell Salmon farms, as soon as the drilling outfit can be moved, and several other wells will be started in the Hayden Pool in Daviess County. R. P. Rowe and Sidney B. Neal who hold leases on about 500 acres adjoining the Hayden farm on the northeast are getting ready to start two wells. Indications are that within the next week or at least a dozen drilling machines will be at work around the Hayden.

Ohio County

The best well reported from the Ohio County Field since the last report was the one drilled by the Cumberland Petroleum Co. for Taylor Yewell and others on the Bob Hamilton 350 acres, 1½ miles southeast of the big Weller lease in the Ambrose Pool. The well is estimated around 250 bbls., and may prove better as 35 feet of good oil sand was drilled through. The Cumberland company has contracted for the drilling of five additional wells on this big tract for the owners and the second well has already been started.

Southeast of the Ambrose Pool, in the vicinity of the big Hamilton well, James C. Ellis drilled in No. 1 on the M. F. Gossett with an initial of 20 bbls. while his No. 1 on the Ira Moseley farm, north of the Mt. Moriah Church property and between the Ambrose Pool and the well on the Hamilton farm, was a dry hole.

The Ohio Oil Co.'s No. 3 on the Delilah Lake farm is reported only a 5-bbl. pumper, being an edge well to the pool.

Daugherty and others' No. 9 on the Cora Wells 130 acres, to the west of the Elmore farm, set a string of 714 feet of casing, got sand from 714 to 754 feet and went to a total depth of 767 feet and was shot with 140 quarts, which produced an initial of 150 bbls., instead of 100 bbls. as first reported.

Creek Drilling Co.'s No. 11 on the Sally Early farm, in the Ambrose Pool, came in a surprise, being a dry hole.

Jordon and Shorts' test on the Gilbert Jolly farm, in Ohio County and 2 miles south of the Daviess County line, is reported good for an initial of 50 bbls., practically opening something new for the operators to work on.

In the Sunnydale Field of Ohio County, Earl Patton's No. 5 well is another with an initial of 100 bbls. A string of 398 feet of casing was set, sand at from 399 to 412 feet and drilled to a total depth of 419 feet and shot with 40 quarts. This farm has proved a productive one and contains 194 acres. Mary E. Wilson and others are owners of the land.

In the same field, the Wood Oil Co. set a string of 398 feet of casing, got sand from 422 to 436 feet in No. 5 on the J. C. Smith 151 acres and was shot with 60 quarts, coming in at 100 bbls. initial production. No. 5 is drilling.

In the same field George Boles drilled a dry hole on the Emil Estridge farm. Thrasher & Shouse drilled two dry holes in Nos. 1 and 2 on the Mark Renfrew 53 acres, in the Sunnydale area, while No. 3 on the same property is reported making a showing for a commercial producer.

Daugherty and others are nearing sand at Nos. 4 and 5 on the Hill Rhodes 150 acres in the Ambrose Pool.

New wells are starting in the Howard Heirs Pool, Collier Pool, King Pool and other sections of Ohio County.

Daviess County

The test well of the Ohio Oil Co. in the SW cor. of the Lawrence F. Roby 87-acre farm, northwest of the Roby Pool, west of Pellville and near the town of St. Lawrence, in Daviess County, opens some new territory, as the initial production is given as 50 bbls.

Overstreet and others are working at a test on the Shores & Taylor farm, 4½ miles north of the town of Maxwell. McMahon and others are drilling a test on the Wimp property, near Berry School, 5½ miles from the Dimmick well on the Ratliff lease.

Barren County

In the Glasgow Field of Barron County, development work is slackening up to some extent owing to the closeness of the winter season. In the Emery-Moore Pool, Fred C. Moore's No. 3 on the Hayde Myers, is reported showing around 5 bbls.

In the Lecta Pool southeast of Glasgow, Samson Oil Co.'s No. 7 Loden is showing for 20 bbls. White & Stombo's No. 5 Williamson, reported at 10 bbls., as is A. W. Ziegler's No. 3 on the Sam Gooden farm.

Edmonson County

North of Mammoth Cave, in Edmonson County, the Green River Oil Co.'s test on the John Potique property is reported a duster. This is the second attempt made by this company to find oil in that area, the first well making a fairly good showing.

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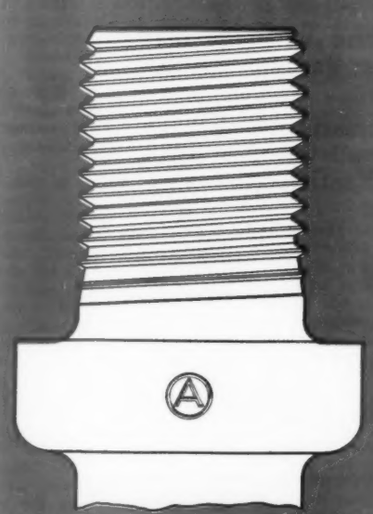

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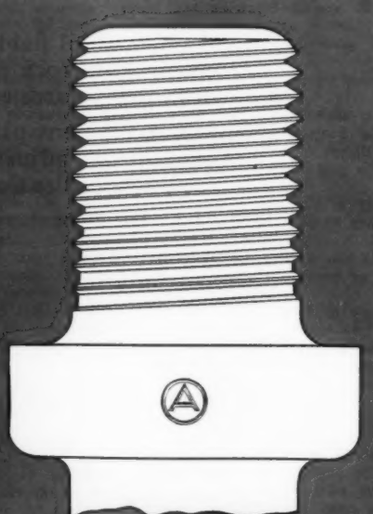

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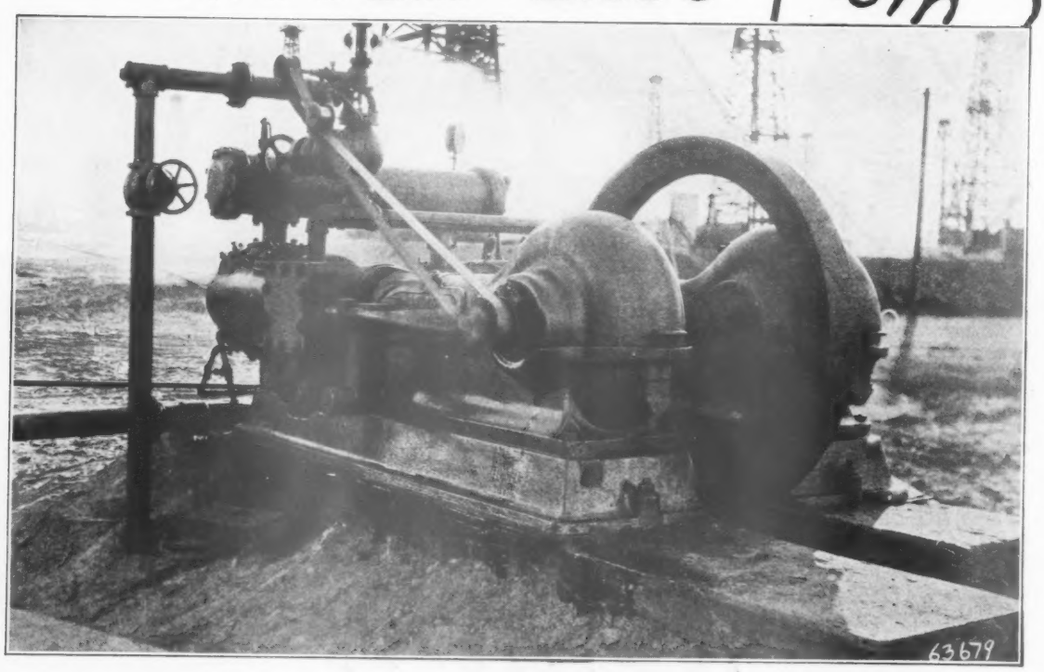

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ROCK WAUGH DRILLS

Recovery of Acid from Sludge Oil

Successful Process Operates at High Temperatures to Effect Rapid Hydrolysis Without Permitting Escape of Water Vapor

By W. N. Davis*
Standard Oil Co. of California.

One of the most serious problems with which the refiner of petroleum must deal is that of the disposal of the sludges resulting from the use of sulphuric acid. This problem is acute from two viewpoints.

First of all, the sludge must be gotten rid of, and dumping it into a pond or slough soon creates an intolerable nuisance. It cannot be discharged through the usual outlets for sewage for a like reason. Most sludges are poor fuels, owing their low thermal value to their high acid content. In the past, a great deal of sludge has been burned in open ponds, with no attempt to utilize the heat, while in some cases specially-designed furnaces have been employed for handling it as fuel. The development of special burners and improved technique of firing have subsequently made it possible to burn certain classes of sludge under boilers and stills with fair efficiencies, but at best, the soot and fume nuisance make such practice unpopular in thickly-settled communities.

A second feature of importance is that the recovery or regeneration of acid from the sludges can be made to result in large savings to the industry providing an efficient process for its recovery is available.

The essential features of such a process must be the recovery of the oily or tarry matter and sulphuric acid in the best possible conditions for further use. In the case of the tars, there are many possibilities for utilization. It has been used directly, as for example, for paving asphalt, and other products for special uses have been prepared from it. In general, however, the bulk of this tar will be used for fuel. On account of its viscosity, which is generally high, and its corrosive nature, it is of lower value than fuel oil and will, therefore, be used for refinery fuel.

The residual sulphuric acid in sludge is more dilute than the acid originally used, so that were it possible to separate it directly, it would still require concentration before use. In order to concentrate it efficiently, it must be recovered in a relatively pure condition, free from foreign matter, at the highest possible strength consistent with these requirements.

Composition of Sludge Acid

Before proceeding with a discussion of recovery, it will be well to note the approximate composition of the material to be dealt with. There is little information available in the first place as to the composition of the so-called impurities taken out of the oil by acid treating. In all probability these compounds undergo radical changes in composition when subjected to the action of sulphuric acid. Certain classes of compounds are dissolved in the excess acid used, others are combined as sulphates or sulphonic acids, while still others may be oxidized or polymerized to tarry compounds of high molecular weight.

Naturally, the amounts of these compounds present will vary considerably in accordance with the strength and amount of acid used, the temperature at which treatment takes place, and the nature of the oil undergoing treatment. In view of these considerations, it does not appear possible to generally define our material, but it will be sufficient for our purpose to classify acid sludge as an emulsion or solution of tarry matter in unspent acid which in turn holds in solution sulphuric addition products.

A process for recovery of acid must then accomplish at least two things; that is, separate the tars from the acid and convert the impurities in the acid to compounds soluble only in the tars. This may be accomplished to some extent by simply adding water to the sludge and heating gently. Sulphuric acid addition products are split or hydrolyzed by water to reform sulphuric acid and neutral organic compounds. In various modifications this hydrolysis has been practiced by many refiners for years, generally being accomplished by steaming in open tanks.

In the case of certain sludges, the acid recovered by this process is sufficiently free from acid addition products to permit concentration without excessive losses or other difficulties. Many sludges, however, are treated with only indifferent results by this method. The difficulties are that the acid recovered contains such a large content of organic matter in solution that when concentration is attempted, charring and coke formation take place and acid is lost by reduction to sulphur dioxide. The formation of coke necessitates frequent shutdowns for cleaning the concentrator, which, added to the loss of acid occasioned by its reduction to sulphuric dioxide, increases costs so excessively that recovery becomes unprofitable and may be continued simply for the purpose of disposing of a nuisance.

It is well known that the rate of hydrolysis or splitting of sulphuric acid addition products is accelerated by the use of high temperature. If the hydrolysis of sludge can be effected completely, the weak sulphuric acid recovered will be clean enough so that it can be reconcentrated with only nominal losses to any desired strength.

Attempts have been made, therefore, to steam sludges to high temperatures. Unfortunately, the sulphuric acid present begins to lose water at these temperatures, and as it concentrates, it becomes an effective oxidizing agent. Loss of acid as sulphur dioxide and extensive charring and coking of the tarry matter result. In addtion, as the acid becomes concentrated, the rate of hydrolysis decreases and, in fact, recombination of acid with the tars may take place to such an extent that the acid actually becomes more highly charged with carbonaceous matter and more difficult to handle in a concentrating plant.

Type of Powers

Efficient recovery therefore demands a process which will enable us to heat sludge to temperatures sufficiently high to effect rapid hydrolysis without permitting the escape of water vapor and the consequent destruction of acid. This can be accomplished by heating under a pressure slightly higher than the pressure exerted by steam over acid of the strength being recovered. Under these conditions, many sludges may be heated to as high as 350 degrees Fahrenheit for periods up to two hours, producting clean acid for subsequent concentration and a tar of low acidity and viscosity which, compared to the original sludge, is an excellent fuel.

The exact temperature, proper reaction time, and dilution of the acid to be produced for best results in this hydrolization will depend on the type and properties of the sludges being treated. Thus, some naphtha sludges require only one hour's treatment at 275 degrees Fahrenheit, producing 40 degrees Baume acid, cracked naphtha sludges one hour at 320 degres Fahrenheit, producing 45 degrees Baume acid, while a sludge produced in manufacturing kerosene by treating with fuming acid at 150 degrees Fahrenheit, will require two hours at 340 degrees Fahrenheit, producing 49-50 degrees Baume acid. The pressures at which these operations are carried out vary from about 25 pounds for the naphtha sludge to as high as 65 pounds for the fuming acid keorsene sludge.

Naturally, the development of equipment to handle sludge and dilute sulphuric acid at these temperatures and pressure has been a very difficult problem. The first retorts constructed for this purpose were horizontal steel cylinders lined with pure 16-pound lead and were operated by a batch method, that is, sludge and the required amount of water were charged and steam was then turned in through a line disposed on the bottom in such a manner that complete mixing and even heat distribution were obtained. The results as far as recovery went were excellent but deterioration of the equipment was excessive. Steam lines corroded rapidly unless they were made of cast lead, in which case erosion by the steam caused rapid destruction. Alternate heating and cooling of the retort resulted in cracking the purest lead linings. Valves for withdrawing the retort contents after a run were made of the best acid-resisting alloys obtainable and lasted for a matter of hours only.

These difficulties have been corrected by process and equipment improvements to such an extent that while repairs are still appreciable, they have been reduced to a nominal sum on the tonnage of acid produced. The greatest benefits realized in the perfection of this process have resulted from the successful conversion of the plant to continuous operation. These improvements took a considerable period for their development and need not be discussed chronologically. It will suffice to describe the latest design and method of operation.

Design of Apparatus

A retort having a capacity of 100-125 tons of 40 degrees Baume acid, consists of a steel shell approximately 30 feet long by 6 feet in diameter, lined with heavy sheet lead which is overlaid with acid-proof brick set in acid-resisting cement. This insulates the lead and protects it against corrosion and mechanical failure. The alternating hot and cold periods encountered in a batch process, which were the main cause for lead failure, have been reduced by converting to continuous operation. Sludge, water and steam in the ratio together in a mixing device, where they are intimately mixed almost instantaneously, and are then passed into the retort or digester. The acid and tar separate into layers in the retort and may be withdrawn independently. It will be seen that, by suitable arrangement of the acid and tar outlets, any desired ratio of acid volume to tar volume may be maintaind, while their ratio as they enter the retort is fixed by the composition of the sludge being retorted. It is evident, if a mixture which results in the production of equal volumes of weak acid and tar is being charged in any batch process, the tar and acid will both be subjected to the same time-temperature treatment. On the other hand if, in the same case, the tar is withdrawn almost as fast as it separates, keeping a thin layer in the retort, it will pass through the apparatus at a high rate, being subjected to the effect of the high retort temperature for a relatively short time only. The tar will therefore be less subject to oxidation and leave the retort in a more fluid condition. Another benefit derived is that the acid separates from a limpid tar more rapidly than from a viscous, stringy tar. If the volume of tar in the retort is reduced as outlined, it is evident that the volume of acid which it is possible to carry in the apparatus is nearly doubled. The effect of this is to increase the average throughput time of the acid, which gives it a long digestion at high temperature, essential to the production of a clean acid.

The tars produced by this process have a low acid content and while not merchantable as fuel oil, are a very acceptable refinery oil. On account of their low viscosity and low acidity they may be burned without soot or fume nuisance. The heating value of these tars will range from 13,000 to 15,000 B.t.u. per pound, making boiler or still furnace modification or enlargement unnecessary, therefore, for their efficient utilization.

Removal of the bulk acid from the tar must naturally greatly increase the yield of acid from sludge. Pressure retorting has practically doubled the yields of weak acid formerly obtained, and on account of its low carbonaceous content, concentrating difficulties have been largely overcome.

The concentration of clean recovered sulphuric acid is not a problem in itself and may be accomplished efficiently by many well-known processes. Concentrating difficulties are usually the result of incomplete or inefficient retorting of the sludge. It has been shown that these difficulties in the case of acid of high carbonaceous content may be so great as to make it impractical to attempt concentration. The method of pressure retorting which has been described has solved these difficulties to an extent which permits recovery of acid sludge at a substantial profit.

*Before American Petroleum Institute, Chicago.

RESULTS OF USAGE OF A.P.I. TAPER JOINTS

(Continued from Page 72)

tools that we purchase and on tools that are made in our own shops."

The following is from a large company in Houston, Tex.:

"All new orders placed specify A.P.I. standards."

The following extract from a prominent eastern manufacturer (not a manufacturer of cable tools) is significant, however, by way of illustrating co-operation. He says:

"Our suggestion to all is 'the quickest way to change over—is to change over,' which we did at once."

The following is from one of the largest independent producers in the Mid-Continent:

"We are co-operating in this work to the extent of our ability and will continue to do so, having in mind that this is the one way in which economy can be secured in the purchase and use of oil field material and supplies."

The following facts should be borne in mind: These standards were prepared by men experienced in the business, not only from the consumers' point of view but of the manufacturers. The most expert assistance possible has been secured in the manufacture and calibration of the gauges. There seems nothing left for us to do but to put them into everyday practical use. Personally speaking, I can see no logical argument against standardization of this kind.

CRACKING BEATS LEGISLATION

Scientific effort holds the promise of the future. Much has already been accomplished. The cracking process has done more for conservation than any legislative scheme which could be put into effect under our constitutional system.—Charles E. Hughes.

Maker and User of Boiler Benefit

A.P.I. Specifications Afford Economies in Construction Besides Many Advantages to the Oil Producer in the Field

By R. G. Hamaker*
Humble Oil & Refining Co., Houston, Tex.

The standardization work of the American Petroleum Institute has been applied to oil field boilers with the result that many advantages and economies are definitely apparent for the boiler manufacturer and the production department of the petroleum industry.

The A.P.I. boiler specifications have been developed by a committee composed of the best talent available among oil field operators and all oil-field-type-boiler manufacturers.

Construction Specifications

Construction details are based upon the A.S.M.E. boiler construction code, long recognized as the best authority on boiler construction. The A.S.M.E. boiler code has, as a matter of fact, been made a part of these A.P.I. specifications and by its adoption the buyer is guaranteed protection. The code provides accurate and reliable material specifications for such as boiler plate, castings, rivets, stay bolts, etc. These specifications provide for inspection, rejections, ladle analyses and check analyses, and includes physical tests such as tension tests, bend tests, quench bend tests, gauge variation, flattening tests, fracture tests, modification of elongation, etc., and chemical composition requirements. The user is assured safety, quality and proper steam capacity for the size of boiler specified.

Boilers which have been built in accordance with the A.P.I. specifications and bear the A.P.I. stamp can be operated in any part of the country without changes in the boiler to meet local requirements for obtaining permits for installation and operation.

One prominent boiler manufacturer is quoted as follows:

"Regarding the A.P.I. specifications for oil field boilers there is only one argument, that is the purchaser knows just exactly what he is getting when he specifies A.P.I. This assures the purchaser that he gets value received for every dollar he pays when purchasing an A.P.I. boiler."

Boiler Rating

Prior to the A.P.I. specifications there was no standard or common method for computing boiler horse power. "In estimating the heating surface of a boiler it is customary to take the area of the boiler in contact with the heat generated on one side and water on the other side. The evaporative quality of a boiler is assumed to be proportionate to the number of square feet of heating surface." This is an arbitrary way of rating a boiler which is to some extent misleading because it is possible to have two boilers with the same heating surface which do not have the same steam raising capacity. The reason for this is that all parts of the heating surface do not possess the same thermal efficiency. The flow of heat from one side of the heating surface to the other side depends upon the temperature differenec between these two points and the rate of heat transmission increases much faster than the increase in temperature difference. However, this method does afford a satisfactory and practical means for rating oil field boilers.

A.P.I. boilers are rated upon 10 square feet of heating surface for a boiler horse power. Before this standardized method of rating a boiler was established, two boilers of equal heating surface and possessing equal efficiency could vary in rating as much as 12 to 13 horse power. Naturally such variation in rating is misleading to purchasers as well as unfair to manufacturers.

Boiler Sizes

The number of sizes of A.P.I. boilers has been reduced to four, thus eliminating, for both the operator and manufacturer, excessive stocks of boilers of many sizes.

Working pressures have been specified for the four different sizes of boilers. They are as follows:

30 H. P. .....150 pounds
50 H. P. .....150 pounds
65 H. P. .....175 pounds
85 H. P. .....175 pounds

These pressures are pretty high for oil field type boilers and it must be remembered that a boiler of sufficient capacity with steam lines of ample capacity and protection provided are far more important to the delivery of horse power than the pressure carried at the boiler. Good boiler installation and operation will bear out this statement. Several worthwhile papers have been written on "How to get more steam out of oil field boilers" and few, if any of these, make reference to the requirements of high working pressures.

Standard Openings and Fittings

In the past, in furnishing fittings with boilers, each manufacturer and purchaser usually had varying ideas of the necessary size and kind of fittings. The committee, therefore, made a standard list of the number and sizes of fittings to be furnished when the purchaser desired fittings to be delivered with the boiler. In order to simplify this list of fittings, the standard sizes and numbers for all A.P.I. boilers were made the same with the exception that the 30-horsepower boiler only requires one safety valve.

Safety valve flanges will be located on the sides of the dome and will, therefore, be in accord with the A.S.M.E. code, which requires that all safety valves shall be connected to the boiler independently of any other steam connection and attached as close as possible to the boiler without any unnecessary intervening pipe or fitting.

It will be noted that the pipe sizes are reduced to a minimum number which is a distinct advantage in the piping and in the carrying of stocks of pipe and fittings.

In Table 2 of the A.P.I. boiler specification is tabulated a list of standard openings and fittings which will be furnished by the manufacturer.

In Table 3 is provided a standard list of fittings to be furnished at the option of the purchaser.

As provided in Table 2, steam connections for all sizes of boilers will be 3 inches, having threaded openings of standard thread. Likewise, the size and number of boiler feed connections, size and number of blowoff connections, size and number of gauge cock connections and size of water gauge opening have been made standard for all sizes of A. P.I. boilers.

Stacks for all A.P.I. boilers will be 28 feet long and carry standard flanges designed by the committee. This provides for efficient, well-made stacks, easy to erect and with interchangeability.

Complete interchangeability of hand-hole plates, gaskets and crabs has been provided for with the adoption of a standard 3½ by 4½ hand-hole plate. The economy in such a standard will be materially reflected on the shelves of oil company warehouses. On a warehouse shelf recently examined by the writer four different sizes of hand-hole plates were found and upon inquiry from the warehouseman it was learned that it has heretofore been necessary to always carry all of these different sizes of hand-hole plates with gaskets in order to be prepared to supply emergency orders for boilers of any make or size that may, at any time, be moved into the district.

In Table 3 standardized steam gauges with siphon, cock and test gauge are provided for.

Water gauge connections and water gauge glass sizes have likewise been made uniform.

Feed water valves, including the check valve located near the boiler and a valve or cock between the check valve and the boiler, have been made standard for all sizes of A.P.I. boilers.

How to Specify A.P.I. Boilers

Purchasers of new boilers when ordering A.P.I. boilers should cover in their order the following points:

(a) Specify A.P.I. standard oil field boiler of size desired.

(b) Designate desired dome location, either over firebox or over barrel of boiler.

(c) Specify whether standard list of fittings is desired. Boilers so purchased

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*Before American Petroleum Institute, Chicago

Preventing Accidents in Industry

Accident Prevention and Fire Prevention Declared to Go Together. Policy of Taking Precautions Pays

By H. N. Blakeslee*
Petroleum Section, National Safety Council.

As many fires result from accidents and many workers are injured by fires, it is logical that accident prevention and fire prevention be considered together.

A short time ago a fire costing about $50,000 occurred in a refinery due to a cracked connection on a heat exchanger. The line carrying the cold oil into the heat exchanger was connected up rigidly where a swing joint should have been used. The variation in heat caused a fitting to crack, a spray of oil came through the crack causing an oil and air mixture. This mixture floated along the ground as oil vapors do, being heavier than air, until the proper mixture came in contact with flame in a fire box. An explosion and fire resulted. This preventable accident cost $50,000 for reconstruction alone, not taking into account the loss of production while the units were being reconstructed. Fortunately, no one was injured. Such an accident is a forceful reminder to refinery managers that allowance must be made for varying temperatures by providing flexible joints. This is not a new thought or principle but is just an instance of lack of foresight or incompetence on the part of a construction boss and as the plant manager is responsible for results obtained on the job the fire may have been the result of his oversight.

Recently an oil worker was killed by having his clothing catch on a set screw on a revolving shaft. This was a California case and the Industrial Accident Commission ruled that the employer was guilty of gross negligence in not guarding the set screw although the entire machine was protected by a fence. In additional to the usual $5,000 award for an industrial death, the State penalized the employer 50 per cent—or $2,500—for having failed to provide proper protection.

Penalty Awards

When penalty awards are made, insurance companies do not pay them so the employer must dig up the cold cash even though insured. The death caused by the set screw cost the employer $7,500 and was preventable either by using a safety set screw or providing a simple guard and is just another case of lack of vision on somebody's part.

A crew of rig builders strengthened a derrick by putting on extra braces, some of which were placed over the outside of the derrick ladder. One night when the derrick man was on the fourble board, the well began to flow. The driller called to the derrick man to come down out of the derrick. While he was coming down the driller put out the derrick lights and the boiler fire to eliminate any possibility of the flowing oil being ignited. Coming down in the darkness over the extra braces, the derrick man fell to his death.

In the state where the derrick man was killed compensation is governed by the number and character of dependents and on the earnings of the deceased. It did not occur to the superintendent of this operation that he was in any way to blame but a high official actually blamed himself for the existence of an obstruction over a derrick ladder which caused a worker to fall to his death. It brought him to a realization that it was a definite part of his responsibility to see that such hazards were not created on his operations.

Numerous cases can be cited where the injured is still living and is receiving medical care and compensation from the employer which have greatly exceeded the cost of an industrial death. Such cases add emphasis to the expense of the industrial accident burden and the value of accident prevention.

Our auditors have not been charging accident claims costs to production. If they were to do so these costs would rise considerably with a few $7,500 awards added in.

Employe's Negligence

The question may be asked, is the employe ever penalized when he has contributed to his own injury by gross negligence? The answer is "yes, he is liable in some states to a 50 per cent reduction of his compensation award" but proving gross negligence on the part of an employ under supervision is difficult. For example, an employe removed the hand rail on a scaffold and proceeded with

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*Before American Petroleum Institute, Chicago.

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DARLING GATE VALVES

State and Municipal Oil Taxation

Inequality of the Burden Most Marked. Need for United Effort to Stem the Legislative Tide Urged on Institute

By F. E. Packard*
General and Tax Attorney for Standard Oil Co. of Indiana.

In nature "low visibility" is the law of life to those unfortunate creatures endowed neither with weapons of defense nor organs of swift locomotion. Occasionally there exists a fighting species armed with perfectly good weapons of defense, which, through bitter experience at the hands of predatory hunters, or because it lacks the "will to fight," has voluntarily joined these unfortunates who preserve life by humility and camouflage. While it may be wise for small creatures to seek life through adaptability to their environment, and through invisibility maintain life even for a longer period than their fighting neighbors, this only remains true so long as they are unimportant as a food supply. If they are edible, or, if in the course of evolution they become bulky and, in addition, an important source of food supply, low visibility is an inadequate defense and they fall victims to their fighting neighbors and are in danger of extinction.

I have often reflected on the similarity between these natural organisms and the artificial corporate creatures of the state which belong to that branch of modern business known as the "oil industry." Low visibility seems to be the law of life to the members of this group; and more particularly to those members having to do with political relations and taxation. No doubt experience has had much to do with their attitude toward the public and the state. I have often wondered whether it was the failure of their creators to give them weapons of defense or that they lacked the will-to-fight for their legitimate "place in the sun."

Without questioning the wisdom of the policy of low visibility seemingly adopted in the past, it is obvious that the time has come when such a policy should be carefully scrutinized in juxtaposition with a policy which involves the exercise of weapons of defense as a means of securing legal right and a place in the sun. Obviously these artificial creatures have grown so bulky and are such a source of toothsome food supply for these other great artificial creatures, the States, that they no longer can depend for protection upon low visibility.

In theory, at least, equality of burden and equal protection of law is the cornerstone of taxation, but I venture the suggestion that such equality and protection can seldom be secured and never long maintained by a policy of low visibility. It can only be maintained by "eternal vigilance" and keeping the weapons of defense in a high state of efficiency and standing forth with courage and such weapons ready to hand whenever that equality and protection is denied.

Failed to Demand Rights

The most casual survey of this industry during the past decade carries conviction that it has not, except upon rare occasions, battled for its obvious legal and economic right to an equality of tax burden. The policy of low invisibility has led to the inevitable curtailment of this right which is so necessary to the proper development of the highly complex and delicately balanced industrial organizations of modern times. Embarrassing and paralyzing inquisition by public officials and hampering and burdensome tax levies by law making bodies have embarrassed the industry and burdened the public. The fact is too obvious to need more than mere statement that in many instances the result might have been otherwise had intelligent and courageous resistance been made to unjust laws and inequality of burden. Instead of such resistance the industry has again and again submitted to embarassing burdens in order to avoid greater embarrassment and greater burdens which might seem to loom in the future.

A survey of the present situation is equally convincing that its future will be much more seriously embarrassed and burdened than has been its past unless courageous and intelligent resistance to each unjust inequality of burden be made without regard to what the future may hold.

The oil industry operates in a field of unrestricted competition and has always been, and is now governed by the same laws, both natural and artificial, that govern other industries, and has no more to fear from publicity resulting from an open battle for its rights, than any other citizen natural or artificial.

Narrowing the discussion for the moment to state taxation, the inequality of burden is most marked. Many illustrations come at once to mind but the injustice of compelling this industry to alone bear the entire burden of a highway system unequalled in the experience of the race, is sufficient. Not only must the industry collect or bear the burden of the tax for this purpose but must collect and guarantee, free of charge, a sum of money which, not so long ago, would have paid the entire expenses of the Federal Government. The examination of the records of any oil company for the past 10 years will reveal the fact that the tax burden it bears has been doubled, trebled and quadrupled, not always over the entire period, but sometimes within a single year, until the burden today staggers this giant of the modern industrial world. No one knows exactly the size of this burden in dollars and cents but I venture the assertion, based upon the meager data at hand, that it is in excess of $300,000,000. Although this figure may be some millions too great or too small, all will agree that it is great enough to constitute a major problem. While the industry may have shown the disposition to fight for its rights in other fields, it has done little but suffer in silence and pay in this field.

Public Officials Human

A wide experience, through a good many years, has taught me that public officials are but human beings. The public demands more and more service from the state and the municipalities, and officials must find the revenue. They have followed the advice which Wolsey gave to Henry VIII. A new wife or a new war demanded more revenue, and that sturdy monarch inquired as to how it might best be secured without endangering his more or less uncertain popularity. Wolsey advised that the sovereign should adopt the practice of the housewife, in plucking feathers from a living goose; take the feathers where they could be secured in the greatest abundance with the least squawking. Tariffs, for this reason, have always been popular with ministers of public finance and all the line of excises which tend to bear indirectly upon the person paying. To this sound maxim must be credited that tendency of legislative bodies and financial ministers to search out those property owners who will part with their feathers without too many squawks. Unhappily the oil industry has fallen into this category and states and municipalities are forever reaching for greater and greater handfuls of feathers from this virile goose which does little squawking. These multiplied pluckings threaten to strip the goose of all but its bill and tail feathers.

The taxes now being imposed upon this industry would surely have shocked our Revolutionary fathers. The general property tax begins with the crude oil in the ground. As soon as it is brought to the surface it is taxed again and yet again and again if it is kept about. It is manufactured and the finished products are taxed not once but several times. Gasoline is taxed in Indiana on March 1; it is shipped to tank farms in the State of Michigan and taxed again on April 1; it is shipped to Wisconsin and taxed again on May 1; and if by any chance any of it should wander over into the State of Missouri it is taxed again on June 1. And then there is the excise tax.

Still More Taxes

It is not enough that the oil be taxed in the ground but it's severance from mother earth must bear a burden; its transportation is the subject of another excise; its storage; its movement; even having it in your possession is subject to a tax; the sale and the use thereof must bear another burden. After this has all been accomplished then the Minister of Finance invokes that modern hydra of police-taxation power and levies an inspection fee upon the commodity itself and upon the equipment used in its distribution under the pleas that it must be regulated, when as a matter of fact he is after more revenue. Even the suspicion that there may be crude oil somewhere is taxed, as witness the very large amount of tax paid upon wildcat leases. Truly the jurist was not joking who laid down the rule that "double taxation is not of necessity illegal." And yet all of this incredible pyramiding of tax burden has scarcely been protested by the industry. But this is not all, after you have struggled by these multitudinous burdens and secured a little net income, the Federal Government takes a more or less generous slice and many of the states as well. The states are not satisfied with the income properly earned within the state but reach out by hypothetical allocation and take net income earned in other states. If all the states in the territory in which the Standard Oil Co. of Indiana operates were to pass income tax laws such as exist now in North Dakota and Wisconsin, it would be compelled to pay upon all net income at lease twice, due to these overlapping allocations.

We are not done yet. New ways are under consideration for securing yet more revenue. Measures aimed at chain stores but placing a prohibitive burden upon the oil industry have been seriously considered by a number of the states, and all but enacted into law in two or three. Other measures aimed at passenger and freight carrying motor vehicle but inclusive of the vehicles of the oil industry are everywhere being considered, many of which, if enacted into the law would place a staggering burden upon the distribution by automotive power of its products. Space forbids a further enumeration of contemplated measures tended to secure yet further revenue from this industry.

In this orgy of taxation the state leads the way but the municipalities are not slow to follow. Throughout the United States they are moving along the same path; levying sales and use taxes upon gasoline; licensing distributors, pumps and what not, until a situation is created which demands most serious consideration.

Net Returns Wiped Out

But you say this burden is all passed on to the public. Can it be passed on where the burden is in excess of the profits of the industry? When to the cost of production and distribution are added the fixed charges of transportation plus these multitudinous taxes, a situation is created where the competition prevailing in the industry will so depress prices as to force the industry itself to bear a portion of the burden and in some instances all of it, out of its net return. In seasons of depression and overproduction, competition becomes abnormal with the result that in many instances net return is wiped out and chaos results.

It would seem that no argument is necessary to establish the truth of the assertion that the burden of state and municipal taxation is a serious problem which ought to be handled with courage and intelligence by the industry. One hears much of the problems of the industry in other fields but little about taxation, yet here is a field where millions of dollars can be saved annually by intelligent co-operation and a courageous resistance to attempts to place unjust and unequal burdens upon it.

Little effort, intelligent or otherwise, has been made to offer a united front in an attempt to stem the legislative tide or to secure equitable taxation. The industry has paid small heed to the gas tax measures, "bus" measures, chain store measures; has made small effort to educate the public either as to its needs or the injury which it suffers from legislations and supervisions; much of which results from want of information. In meeting the situations many oil company executives show a lack of appreciation of the situation. Tax organizations are few, and many inadequately supported, with the result that they function inadequately or at cross purposes and add to the mutual burdens.

To illustrate: from the some 9,000 taxing districts in which the Standard Oil Co. of Indiana files assessment schedules, annually some hundreds of complaints that our assessment at a given point has been increased because of the filing of excessive valuations by other members of the industry. The reason for this extraordinary state of affairs is not that our valuations are filed too low; as a matter of fact I know of no place in our territory where our valuations are less than the average valuation of the property in the taxing jurisdiction.

Composite Ratio Attempted

By careful survey we attempt to arrive at a composite ratio of the assessed to the actual value of all property in a taxing district and file our property at the same ratio. We are seldom, if ever, permitted to do this but must submit to a valuation above the average of our neighbors. No great corporation can hope for as favorable a ratio as property owners generally. Into this peaceful scene comes some other member of the industry who has paid little attention to assessment and taxation either general or in that particular locality and files values for assessment purposes without regard to the ratio of assessed to actual value which prevails. This sort of thing costs the company tens of thousands of dollars annually.

The industry as a whole does not seem to remember that state laws and constitutions, printed in leather-bound books, after due passage by legislative bodies, and requiring 100 per cent assessment, are not binding upon property owners unless they are generally enforced; that no citizen can be required to pay upon a greater percentage of assessed to actual value than generally prevails in his taxing jurisdiction.

Take the specific item of merchandise. Unquestionably illegal assessments under this head alone burden the industry with a sum which could not be enumerated

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*Before American Petroleum Institute, Chicago.

Value of Use of Pumping Standards

Advantages and Results of Actual Experience Described on Tubing, Working Barrels and Parts and Sucker Rods

By T. E. Swigart*
National Chairman, Shell Co. of California.

Critics of the oil business who are quick in detecting its faults, might well pause to examine the voluntary accomplishments of one of the nation's largest industries in standardization. It is doubtful that even Secretary Hoover, whose great vision and practical business genius led to his recommendations for "standardization," or "simplification" as he prefers to call it, anticipated such a vigorous and complete program within a major industry as that sponsored by the American Petroleum Institute.

The oil industry, which so often is accused of lack of co-operation, has refuted these charges by carrying on probably the greatest campaign of standardization of its tools that has ever been effected by an industry in a like period. This engineering project an accomplished fact, the industry is now ready to turn its next problem, namely, improved production methods by which the recovery of oil from fields may be increased. Although this new problem is anything but one of standardization, still the public is justified in expecting the same thorough vigorous and voluntary action that has characterized the petroleum industry's standardization movement.

The mechanical tools for use in this new era in oil field development and exploitation are ready. Through the American Petroleum Institute standardization work, the industry has eliminated thousands of old tools and machinery of widely different dimensions and provided itself with the most up-to-date and improved equipment that could be devised. These tools are the product of the industry's 60-odd years field experience and the best engineering judgment that could be summoned. Their value lies not only in standardization of dimensions and interchangeability in use, but also in their quality and design.

Standard derricks, standard rig irons, standard rotary and cable tool drilling equipment, standard pipe, and finally standard production equipment, the subject of this paper, indicate the completeness of this program.

Less than three years ago production equipment used by the oil industry varied from well to well, field to field, company to company, and from time to time in a given well, field, or company, according to the individual ideas of foremen and equipment manufacturers. Some equipment was good, some bad, but very little of different manufacture was interchangeable. The committee has record of 248 different designs of tubing, sucker rods, oil well pumps and parts. Still others doubtless existed. These have been replaced by 24 standard A.P.I. designs. In addition, foundation bolts, clutch flange dimensions, and methods of rating internal combustion engines for oil field service, have been established.

A.P.I. Standard Tubing

Oil well tubing was one of the first studies of the committee with a result that standards for 2, 2½, 3, and 4-inch plain tubing and for 1¼, 1½, 2, 2½, and 3-inch upset tubing were set two years ago. The innovation of the gas lift and its wide application in the Mid-Continent fields, particularly at Seminole, caused the committee to add three more sizes of tubing to A.P.I. Standards, namely, 3½-inch plain and 3½ and 4-inch upset. These sizes are being used in tapered or telescoped flow strings. Their adoption has especial significance at this time in that it illustrates the flexibility of the standardization program. A need arose for new sizes which could not have been foreseen when the original standards were drawn. No time was lost by the committee in caring for this need. This tubing is already in use in the fields, although the standards have barely been adopted.

By virtue of long collars and long-thread engagement, as well as certain details of thread and coupling design, A.P.I. tubing is a greatly superior product to the old style of tubing that has been in common use. It is found that 71 A.P.I. dimensions replace 289 old dimensions showing the simplification of design effected.

By virtue of having longer thread engagements, A.P.I. tubing is stronger when first made up and is capable of withstanding the making and breaking of joints for a longer period of time without weakening the tubing, than is the old style. This is an advantage both from the standpoint of lessening the danger of parting and lessening the chance for leaks at couplings.

These collars of A.P.I. tubing are so recessed that the joints are readily stabbed and will not cross thread.

Results Overcome Prejudice

A.P.I. plain tubing is threaded with 11½ threads per inch and upset tubing with 10 threads per inch, with the exception of 3½ and 4-inch plain tubing which have 10 threads and 1¼ and 1½-inch upset tubing which have 11½ threads. Although some prejudice has existed among certain operators against the use of 10-thread tubing, still this has been largely overcome by splendid results which 10-thread tubing has given in California where, at present, the longest strings of tubing are in use.

A string of 4,500 feet of a 2½-inch upset A.P.I. tubing after having been pulled in stands of four joints each from a well in the Santa Fe Springs Field weighed 29,250 pounds, or 14.6 tons and required a special "racking" platform on the derrick floor, to support the weight. All this weight must be borne by the joints near the top of the string and the importance of an extra strong joint is paramount.

A canvas of the tube manufacturers has shown that approximately 11,000,000 feet, or 2,080 miles of A.P.I. tubing has been sold in the United States during the first year and one-half of manufacture. Of this amount 4,500,000 feet, or 850 miles, was sold to Mid-Continent operators and 6,500,000 feet, or 1,230 miles, to California operators. Approximately 90 per cent of all A.P.I. tubing sold in California was 10-thread upset. All large operators in California have used A.P.I. tubing for over a year, and most of them use it exclusively. In fact, practically no tubing excepting A.P.I. standard tubing is now sold in California. Its advantages over all other kinds are:

1. Better design than old styles of tubing and therefore stronger.
2. Long collars on A.P.I. tubing will stand more making and breaking; will not cross thread on the joint.
3. Complete interchangeability between brands.
4. Large reductions in operators' stocks of tubing because of standardized dimensions.
5. Elimination of confusion at wells caused by failure of two makes of tubing to "go" together.
6. All working barrels, tubing catchers, tubing heads, landing nipples, etc., will soon be manufactured with standard A.P.I. threads and use of any other kind of tubing will require subnipples which will cause endless confusion and costly delays in the field.
7. Users of A.P.I. tubing will get best tubing available at lowest cost—users of others kinds soon will have to obtain it "special order" and eventually this will mean higher prices.
8. No standards or gauges have been established for any but strictly A.P.I. standard tubing and failure to use A.P.I. standards loses the producer all the advantages of standardization, namely, workmanship, interchangeability, recourse to manufacturer in the event of imperfections, and the like.
9. Field tools for tubing (and rods) can be reduced in number.

Situation Summarized

W. L. McLaine, director of production of the General Petroleum Corp., Los Angeles, Calif., summed up the situation in his paper before the Colorado Springs Standardization Conference in June, 1927, when he said:

"I can only think of one possible disadvantage to the adoption of A.P.I. tubing and that is the inconvenience at a few wells where the new tubing will have to be mixed with the old. This objection strikes at the heart of our standardization work for if we were to allow this objection to rule, the standardization movement might as well never have been started.

"The inconvenience of mixing tubing is suffered alike by all operators whether Eastern, Mid-Continent or California, because the new joints are different from all of the old joints in length of thread engagement and subnipples must be used in mixed strings to insure greatest safety. We are largely overcoming the necessity for mixed strings in California by installing complete new strings of A.P.I. tubing in wells and salvaging the good joints of the old-style tubing. Occasionally, when a few joints of old-style tubing are bad in a certain well, they are replaced from the salvage stock of old-style tubing. In addition, we use much old-style tubing that is no longer fit to run in wells for line pipe, so actually very little mixing of strings is necessary."

The practicability and superiority of A.P.I. tubing have been so clearly proved in the field that the committee has no hesitancy in urging oil operators who have not already adopted A.P.I. tubing to do so without delay. In fact, A.P.I. tubing has given such outstandingly good results that, in the interests of good business, operators who have not already adopted it cannot afford longer to ignore its advantages.

A.P.I. Standard Sucker Rods

Sucker rods, like other kinds of oil field equipment, varied greatly in design. By adopting A.P.I. standards, over 90 general dimensions were replaced by 25 dimensions. Standards have been adopted for three sizes of rods, namely, five-eighths, three-fourths and seven-eighths-inch rods.

The history of the development of the A.P.I. sucker rods is of particular interest. During the early days of the committee it was found that many differences of opinion existed among operators regarding the design of sucker rod joints and the importance of design. These difficulties were so marked that it became apparent that the committee as a whole could not expect to develop a standard design along engineering lines, so the then national chairman, W. L. McLaine, appointed a subcommittee and charged the subcommittee with the duty of developing a proposed standard A.P.I. sucker rod joint. The subcommittee of six engineers included some of the most capable men obtainable, both from the operators and rod manufacturers. Every point of design was studied by this subcommittee and determined upon only after mature deliberation. The final product, which is the present A.P.I. joint, represents the best engineering principles of design. The A.P.I. joint and gauges were ratified at the 1927 Colorado Springs meetings and are described in detail in A.P.I. Standards 11-B.

The diameters of the pins for respective sizes of rods were increased over the diameters in use by the majority of manufacturers in order to give greater strength. For example, the three-quarter-inch A.P.I. sucker rod has a nominal outside diameter of 1 1/16-inch as compared to nominal outside diameters varying from seven-eighths-inch to 1 1/16-inch on most old styles of rods.

A.P.I. sucker rod specifications call for 10 United States standard threads per inch as specified by the National Screw Thread Commission. The screw thread commission allows both a sharp and a flat-top form of thread and the flat-top form was adopted by the committee for the A.P.I. sucker rod joint, in the interest of ruggedness. Another valuable feature of the A.P.I. sucker rod joint is the provision for a vanishing thread. The crests of the last three threads on the box and the roots of the last four threads on the pin are vanished with a taper of 9 degrees in order to provide additional stock near the base of the pin and thus prevent pin breakages which, observation shows, tend to occur in the first or second thread. At the base of the pin a fillet is provided between the pin cylinder and pin collar. This again is an accepted principle of engineering design to provide against pin breakages at the contact of the pin cylinder and pin collar.

Couplings Can Be Replaced

The sucker rod coupling for double pin rods is of larger diameter than the pin collar in order to provide stock in the coupling which will wear and at the same time prevent wear of the pin collar. As couplings wear down to or near the diameter of the pin collar, they can be replaced with new couplings at low cost and the entire length of the sucker rod preserved for further use. This would not be possible if the outside diameter of the coupling was the same as the outside diameter of the pin collar, because the rod itself would wear in that case and would require replacing as wear became great.

The A.P.I. sucker rod joints is so designed that the face of the coupling makes contact with the face of the pin collar. In making up A.P.I. sucker rod joints in the field, the coupling should always be shouldered against the pin collar face. However, the tolerances on A.P.I. sucker rod threads are so narrow and the gauging system provided is so accurate that the threads will always make up tight and thus make additional provision against unscrewing.

Thus while the A.P.I. sucker rod joint is not an exact duplicate of any sucker rod joint now sold by manufacturers, it includes the best principles of design of several different makes and is expected to provide a superior joint. Manufacturers have advised that excellent reports of performance are being received.

The problem of deep well pumping is one of grave concern both to oil operators and to sucker rod manufacturers. In California, wells of 5,000 feet and more in depth are being pumped and wells up to 6,800 feet are now flowing, but some day may require pumping. It is believed that the A.P.I. design of sucker rod joint will meet the requirements of present deep wells, provided manufacturers are able to develop alloy steels or heat treating processes which will increase the strength of rods beyond the strengths of present sucker rod steels. In other words, the sucker rod

*Before American Petroleum Institute, Chicago.

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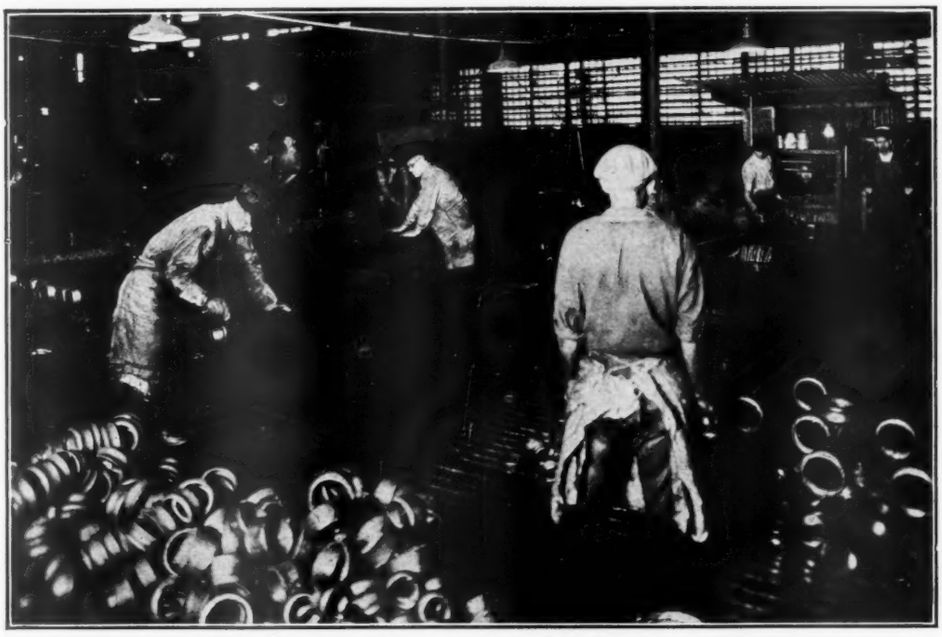

Wheeling Inspection is thorough. The accuracy of threads on pipe and couplings is systematically checked against working gauges. Each individual threaded end and each coupling is checked and verified with a gauge. No expense has been spared to insure a high standard of perfection for all products.

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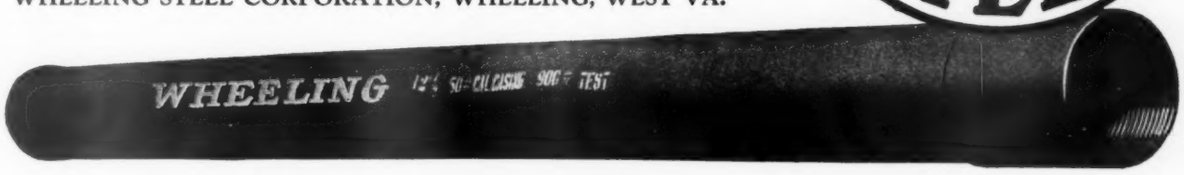

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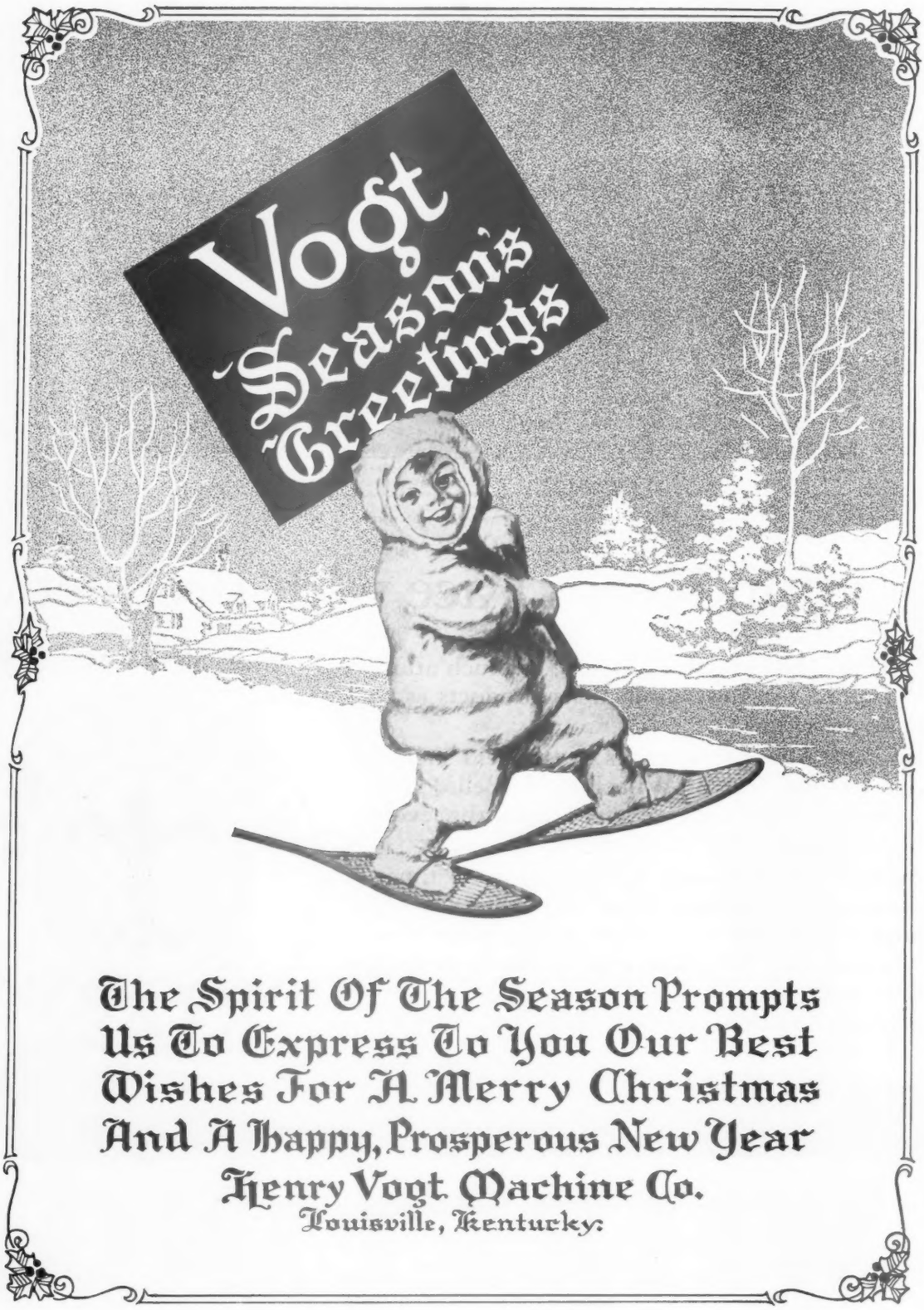


The Spirit Of The Season Prompts
Us To Express To You Our Best
Wishes For A Merry Christmas
And A Happy, Prosperous New Year
Henry Vogt Machine Co.
Louisville, Kentucky.

problem at this time appears to be one of material rather than design.

Although final ratification of sucker rod standards and gauge dimensions was only reached at the 1927 Midyear Standardization Conference at Colorado Springs, several rod manufacturers have been making sucker rods with A.P.I. joints. These rods do not carry the A.P.I. monogram and cannot be guaranteed as A.P.I. standard because no gauges were available, but they represent the manufacturers' interpretation of A.P.I. specifications and doubtless are very close to the official A.P.I. specification.

Many producers are specifying these rods and a canvass of rod manufacturers has shown that 3,454,340 feet of these unofficial A.P.I. rods have been sold. This is an equivalent of 874 strings of A.P.I. rods, each 4,000 feet long. To date Mid-Continent operators have purchased 3,139,950 feet and California operators 314,390 feet of unofficial A.P.I. rods.

Excepting in a few instances, field service records are not available by which these rods can be compared to the ones formerly in the same wells. However, where these records are available, it is found that the A.P.I. joint is giving as good or better service than the same make of rod formerly in the well.

Working Barrels and Pumps

The committee has completed specifications for both cold drawn and machined working barrels and, after much effort, has developed a single set of standards for working barrel pump parts regardless of whether they are to be used in machined or cold drawn working barrels.

Standard A.P.I. cold drawn and machined working barrels are to be made in 2, 2½, 3, and 4-inch sizes. A.P.I. standards on both cold drawn and machined working barrels to a great extent, represent present practice.

The gradual change from present practice to A.P.I. working barrel standards will involve no difficulties on the part of the producer. The use of A.P.I. standard working barrels, however, is advantageous to producers because such details as top and bottom coupling designs and dimensions, standing valve shoe dimensions, and the like, will be standard and interchangeable between makes. A.P.I. requirements as to tolerances, workmanship and finish are such that the use of standard A.P.I. working barrels will be advantageous to every operator. Their introduction to the industry will be almost automatic as practically all manufacturers of working barrels are already making or planning to adhere to A.P.I. specifications.

Investigation showed a wide difference in dimensions of pump parts throughout the United States. Practically no two manufacturers had the same standards for types and pitch diameters of threads on cages, plunger nuts, cup plunger bodies, machined plungers, standing valve bodies, and the like. Some 247 old dimensions have been replaced by 60 A.P.I. dimensions.

The committee apparently faced a hopeless task in developing a single set of standards from the large number of differing practices. However, it was finally found possible to adopt eastern standards on 2-inch pumps, because of the large number of such pumps manufactured and in the use of the eastern fields, and western standards for 2½, 3, and 4-inch pumps, because of the numbers of these pumps used in California fields where a relatively small number of 2-inch pumps are in use. As with working barrels, the transition from old standards to new A.P.I. standards will be gradual but automatic and the advantages to the operator are many fold. For example, in the Gulf Coast fields of Texas, cup pumps are used very widely, but in recent years, Gulf Coast operators have been using machined plunger pumps in many wells. With the adopting of A.P.I. standards, all pump fittings will be the same for both cup and machined plunger pumps, and workmen in the fields will never encounter any delays and difficulties in changing the style of pump in a particular well. A single set of fittings carried in storehouses will do for both cup and machined plunger pumps. A similar condition is developing in California where, until recent months, machined plunger pumps were used almost exclusively. Now cup plungers are becoming popular and are being used in great numbers by many operators, and again the matter of interchangeability and simplicity of warehouse stocks is an important one to the operator.

As with other pieces of A.P.I. equipment, the standards finally adopted represent present practice in so far as they are compatible with good engineering design, and the committee has no hesitation in recommending A.P.I. standards on working barrels and pump parts, to the industry.

Internal Combustion Engines and Clutches

Because of the wide divergence of design in internal combustion engines, the committee found it difficult to standardize many mechanical parts. A.P.I. standards which were adopted relate to the size of bolt holes and foundation bolts for internal combustion engines of certain ratings. It was impossible to determine upon a standard layout of foundation bolts for engines of a certain rating because of the great differences in fundamental design by different manufacturers.

It was found possible, however, to design and specify dimensions of a clutch flange connection for internal combustion engines for oil field service and thus insure interchangeability between engines of any make and clutches of other makes.

The committee feels that it has accomplished a very constructive piece of work in developing a standard method of rating internal combustion engines for oil field service. In short, the A.P.I. horsepower rating of horizontal single-cylinder gas, gasoline, or oil engines for oil field service is a double rating which expresses the average maximum brake horsepower as developed by the engine at (a) The recommended operating speed for pumping service and (b) the tested speed of maximum power.

The need for developing some standard method of rating internal combustion engines arose through the practice of different manufacturers in assigning the same rating to engines of widely varying power ranges. Also a gas engine for pumping only develops the power advertised as its rating at one particular speed.

A purchaser of engines who did not have access to speed-horsepower curves for engines submitted to him had no way of knowing at what speed an engine would develop the advertised rating or what range of power the engine had at different speeds. For that matter many purchasers are not engineers and therefore to not know what ranges of power and speed are best suited to their particular needs.

Tests show that some manufacturers have built comparatively small engines which sell at relatively low prices but which are designated as 40 horsepower engines. Other manufacturers have built heavy powerful engines and have classed them as 40 horsepower engines. One advertises low prices and the other great power. Actual brake horsepower tests on a number of so-called 40 horsepower engines in common use in the fields showed that the ranges of power of engines varied by as much as 33⅓ per cent. All of these engines were advertised and sold as 40 horsepower engines, although, as might be expected, it was observed that the more powerful engines sold at higher prices. Such a confusing situation causes the ordinary oil operator to wonder what kind of an engine he actually needs and what particular engine will best fit his needs.

The object of the A.P.I. in developing a standard method and code of internal combustion engines is to provide the purchaser with a method of appraising the comparative values of several engines in terms of dollars per horsepower, and also to enable him to determine the limits of speed and power of several engines which might be offered for sale.

Two Points of Interest

A producer who is using engines on a beam pumping well is interested chiefly in two points, first, the power which his engine will develop at the normal pumping speed, and second, the maximum power that the engine will develop and at what speed, because the latter condition is met in pulling rods and tubing. At pumping speed the engine must run smoothly and economically. In deep fields where over 4,000 feet of tubing is pulled, an engine must deliver considerable power and deliver it at a reasonably high rotational speed above the pumping speed, in order to permit pulling and rerunning tubing as fast as possible.

The committee with the co-operation of the gas engine manufacturers worked out the A.P.I. Rating Test Form and Code of Testing for single-cylinder, horizonal, internal combustion engines given in A.P.I. Standards No. 11-C. This system requires every manufacturer of gas engines to present a prospective purchaser a test record form showing, among other things, a characteristic speed-horsepower that the engine will develop on the test block at the factory.

This curve may not show the exact horsepower, of course, that the engine will develop in the field, because there are a great many variable conditions such as the quality of gas, temperature, intake fuel pressure, altitude, and the like, that may vary the horsepower. However, with the data called for by the A.P.I. Test Record Form, allowance can be made for differences in conditions, and a fairly equitable comparison of results of field and factory tests may be obtained.

With the information furnished by the A.P.I. Rating Test Form and Code of Test the only problem left the operator who is purchasing engines is that of determining what performance is required for his particular property or field. It is impossible in a paper of this kind to suggest what kind of an engine will suit each operator's needs as the choice of engines is an engineering problem that must be studied in light of local conditions. The A.P.I., however, has made it possible for oil company engineers to became fully informed on the characteristics of engines offered for sale and this in turn makes it possible for engineers to arrive at a proper selection of engines.

Miscellaneous Items of Equipment

The committee has adopted standards on several miscellaneous items of equipment and is now working on standards for still other pieces of pumping equipment such as oil field motors.

At the 1927 Colorado Springs meeting, the committee made recommendations to oil operators regarding the standardization of pressure gauge taps and fittings at well heads. This matter is of much concern to every operator of flowing and gas lift wells at this time.

Pressure gauge manufacturers follow different practices with regard the size and kind of connections furnished on pressure gauges. It frequently happens that gauges are delivered for use at wells with one-fourth, three-eighths, or one-half-inch connections and the connections may be male, female or even unions. As pressure gauges are usually needed at times of stress when flowing or gas lift wells are being worked upon, and as necessary bushings are seldom available at the wells for making connections, the committee formulated the following recommendations to oil producers to eliminate all confusion and delay:

1. All taps and pressure gauge connections at well heads, including taps and connections for bleeders, are to be one-half-inch standard pipe size.

2. All pressure gauges are to be fitted with bushings to give one-half-inch male pipe connection before being delivered by storehouse to the field.

3. All gauges are to be fitted with valve or stopcock immediately under gauge before being delivered by storehouse to the field.

Compliance with these recommendations will eliminate all confusion in regard to the fitting of pressure gauges and will not interfere with gauge manufacturers' designs .

Another item of pumping equipment that will be standardized are pullrod ends so that all clamps for plain or upset pull rods of a given size will fit any make of rod of the same designation.

The committee also is hoping to apply the same general principles developed in rating single-cylinder horizontal type internal combustion engines for oil field service to the rating of multicylinder engines for oil field service.

Summary

An attempt has been made in this paper to point out the advantages of A.P.I. standard pumping equipment. To date A.P.I. standards have been completed for tubing sucker rods, working barrels, and engine ratings.

This standard equipment has the advantages of simplicity and interchangeability and, moreover, represents the best principles of engineering design that could be developed through the combined efforts of oil operators and supply manufacturers.

The committee on pumping equipment and engines recommends A.P.I. standard equipment to the oil industry; the standards are the product of the industry's experience and have many features to commend them. Those who use them are receiving satisfaction. Those who do not are missing an opportunity to better their field operations.

MAKER AND USER OF BOILER BENEFIT

(Continued from Page 110)

will be the best boilers built and will not include extras not needed.

A.P.I. Operating Code

The A.P.I. code or code of simplified practice has been written by the committee with the aid of the best talent available and has been made a part of the boiler specifications for the purpose of instructing in the erection, connecting up, and operation of A.P.I. boilers.

Boiler Set-Ups

The code provides for a satisfactory and practical setting of locomotive or firebox type boilers. The boiler specifications refer only to this type of boiler in as much as the tendency in the field is to use locomotive type boilers instead of the horizontal return tubular type which have to be rather elaborately supported and bricked in.

When horizontal return tubular boilers are installed they should be supported with the outside suspension type of setting amply protected from the fire.

The firebox for the horizontal return tubular type should be so constructed that a combustion chamber is provided at the burner end wherein complete combustion can be had, thus effecting good boiler efficiency on fuel.

The code also recommends a combustion chamber for the locomotive type boiler to be independent of any below the firebox. By completing combustion with a leak-proof combustion chamber and keeping the firebox tight maximum advantage can be taken of the firing to obtain the greatest amount of steam from the boiler.

The code further provides an explanation of good draft which is necessary to efficient boiler firing.

Likewise, it provides explanatory instruction for the installation of steam headers, main valves, safety valves, blowoffs, burners, feed water connections and gauges.

Under the heading of "Care and Operation" very practical and worthwhile instruction is given for the operation of the boiler with its appurtenances.

Subjects covered are: "Low Water Emergency," "Steam Gauge Care," "Safety Valve Operation," "Blowoff Usage," "Cutting-in and Firing," "Foaming," "Cutting Out or Shutting Down" and "Preparation for Storing," "Cleaning and Washing," "Repairs," etc.

Plant managers will find that much good can be gained through the obtaining and placing of a copy of this code in every oil field house or at every oil field boiler installation.

PURCHASING A.P.I. STANDARDIZED MATERIAL

(Continued from Page 83)

of materials with which to prosecute their tasks.

In concluding comment on this point, you might well ask where the men will be found to supervise these tests. Therefore, may reference be made to the man who is becoming known as the testing engineer and whose skill and knowledge is destined to be gratefully appreciated in the future life of the oil industry. For the most part these men are young men and they are young men because the technology of their profession is itself, in a way, youthful, but they are the vanguard of the legion which is to follow. Both this vanguard and the legion to follow are accurately trained and carefully instructed. These men have minds trained to catch the scent of facts and to run these facts to earth. This group deals with facts and again facts, and their infiltration into any business, specifically into the oil business, is a very valuable thing for the industry.

You will, I feel, be more definitely interested in the following than in the preceding comment. You should be interested because what follows has to do with the tangible results of your efforts: Firstly, the wholehearted acceptance of the idea of American Petroleum Institute standards; and secondly, the actual purchase and successful use of material manufactured under the authorized imprint of the American Petroleum Institute monogram. Truly, it is the rule and not the exception in California for the purchasing agent when buying oil field material to ask as his first question, not the price—wonder of wonders—but, is it made in accordance with American Petroleum Institute specification? Discussion—sincere and approving—is heard from all branches of the oil industry out west regarding the American Petroleum Institute; its many valuable achievements to date, and the indication of the expansive success of its future.

Backing A. P. I.

The institution I represent—the General Petroleum Corporation of California—I can say with truthful pride has from the beginning of the American Petroleum Institute standardization plan been seen in the front rank of the American Petroleum Institute procession, side by side with the major companies in the oil industry of California. Our institution has adopted and purchased materials bearing the official monogram immediately they have become available and I can give no better indication of our future intention as regards the use of the American Petroleum Institute specification materials than to requote in part the executive comment of one of our officials, who said in The Oil and Gas Journal of September 22, 1927: "We are very much impressed with the results already secured by the American Petroleum Institute in its standardization work. We know that this work will have its value in substantial economies in future department and operating expense. These economies result from the application of the three basic principles which the standardization committee of the American Petroleum Institute have kept uppermost in mind—interchangeability, improved material and reduced inventories, and realization of these economies will be materially accelerated if all companies will specify 'A.P.I. Standard' when ordering new material and equipment."

A situation prevails to a certain extent at present in the oil industry which is experienced by any industry when progressive forward movement is instituted. That situation has to do with the disposition of materials rendered semi-obsolete.

This condition as I see it is one of doubt. It is a mental situation in a way. While it is true that materials in large quantities as made according to pre-A.P.I. standard will be rendered obsolete, these same materials need not be discarded. They can be used and their full value realized. It will require the most careful and congenial co-operation between the purchasing and operating departments to accomplish this, but it can be done. It is being done every day, as a matter of fact.

It occurs to me that this attitude of doubt as it exists regarding the A.P.I. is perfectly natural because, to hark back to the horse and buggy days, great apprehension was apparent on all sides when the idea of the automobile was conceived. What was to become of horses? What would happen to the buggy and wagon manufacturer? Well, what did happen to the horse and buggy? They have practically disappeared, but if a ballot were cast today to revert to our preautomotive mode of transportation, the voting favoring the horse and buggy would be what is politically known as "light and scattered," because progress is justified.

Fears Unfounded

What happened when automatic machinery appeared? Labor raised its voice protesting that the mechanical craftsman would be unable to find employment. Were his fears justified? No answer is required. Again the idea of progress was justified.

Probably when the idea of the transcontinental railroad became generally noised about, the pony express rider and the owner of the covered wagon freighter were anxious regarding their future. But was the railroad idea justified? Again, no answer is necessary. Still again was progress justified.

The airplane when the Wright brothers undertook to defy the laws of gravity was thought to be merely a foolish idea of mental incompetence. However, today everyone reads and understands the message written in the skies. It spells progress.

When the standardization plan of the A. P. I. was proposed, it was doubtless the opinion of many that the idea was preposterously impossible. It is still questioned, as already mentioned, but questioned with diminishing intensity of doubt. Mark this, the A. P. I. program of standardization is destined for success just as certainly as were the automobile, the automatic machine, the transcontinental railroad and the airplane, because this undertaking of the A. P. I. spells progress.

The major oil companies do not make a practice of making mistakes of judgment, and as all of the major oil companies throughout the nation support this idea of A. P. I. standardization and support it in tangible manner, they evidently judge the A. P. I. idea to be sound. At any rate, they specify and purchase materials in accordance with A. P. I. specifications.

As a representative purchasing agent in the oil industry, I will welcome most heartily that inevitable day when I can sign my name to orders specifying, without exception, the following: "Materials described on this order to be furnished in strict accordance with A. P. I. specification." Why will I be so glad to do this? Firstly, because one set of specifications will cover each commodity, instead of a different specification for the product of each manufacturer; secondly, because due to interchangeability, inventories in the stores department, for which I am held responsible may be kept at the minimum of investment; thirdly, because materials and parts should at all times be readily available, due again to interchangeability; and finally, because I am definitely sold on the idea of progress.

EDUCATING DRIVER IMPORTANT FACTOR

(Continued from Page 95)

where roads are soon nothing but quagmires and where, in the mad rush for liquid gold, money loses its value. How much more necessary is it for us to give special attention to the proper education of our drivers, due to this condition, than for the small merchants. We must expect in the production field, at least during the early stages of development, some waste as everybody must work under great handicaps. Getting the wells drilled in as soon as possible is the consideration that takes procedure over all else.

Another factor we are facing in all new developments is roads. These are never better than dirt to start with and after one week of use by thousands of these trucks, tractors, and wagons, they are just ruts and holes and no one can afford to stop, day or night, to fix them. So, all the time these thousands of tons of material and equipment are being rushed in, abuse and damage of equipment goes on. This is what we can term necessary waste or expense.

However, the worst feature of the whole operation is the fact that these men on trucks or cars, working night and day, in the dust, mud, and grease, become imbued with the rush and flush production methods and after things get back to normal, they are still operating their equipment without a thought of care, and this is where the greatest saving can be effected by us. This is applicable to all of the equipment used during the flush production period.

The Seminole development is one of the greatest, if not the greatest, of this generation, and if it were possible for you to look at the seething mass of humanity and equipment, three and four lines of traffic abreast, miles long, jamming against each other, moving an inch or a few feet at a time, with hardly a time that any two wheels are on the same level, with trailers attached to trucks, loads boomed tight, with long eight-wheel wagons with as high as 20 teams to a wagon, loaded with every pound they can budge and, besides, thousands of small cars mingled with this mass and taking hours to move a mile, you have just a small glimpse of the true picture. In these cases, if a truck, car, or team has an accident, which does happen every day under the extreme conditions, a winch line is attached to it and it is left on the side of the road. Klondike at its height was a mild show in comparison. So, I say that under these conditions men are sure to get the habit of waste as all are instructed to get to the location with all possible speed. Even with it all, a world of credit is due these truck drivers and teamsters as all material must be moved by them, railroads being able to handle only a small part of the tonnage and then, at best, only part way. The location must be made by the truck or team.

However well you and I may understand these conditions, at the close of each year, the cost sheet is the final answer to the executives, excuses have no place in these reports and we may just as well work out a plan to take care of and improve this condition. With all companies facing the same problems, either in the field of production, marketing, or other activity, the thing we must do is to develop our men.

Another item in which we all have thousands of dollars invested and which is constantly being replaced, is tires. I have come to believe these manufacturers are right in their arguments and am taking their viewpoint in dealing with our tire situation as, after studying our troubles, I find 90 per cent of them are due to under-inflation and abuse. We have started a vigorous campaign on these items and if we can get our car and truck operators to properly use the most free of God's gifts—air—thousands of dollars will be saved. It is a peculiar thing how true some of the old sayings are—for instance, "If it doesn't cost anything, it isn't worth anything." I think this is particularly applicable to the operation of automobiles as air and water are two of the most essential factors and the hardest to get our drivers to use, and in 90 per cent of the cases, they don't even have to get out of their cars at modern filling stations. Another thing, I am almost willing to wager that none of you men have had to issue a bulletin to your drivers warning them concerning filling their gas tanks. An old maxim says "The constant dripping of water weareth away stone," but unfortunately, there is no information on what the effect is on solid ivory.

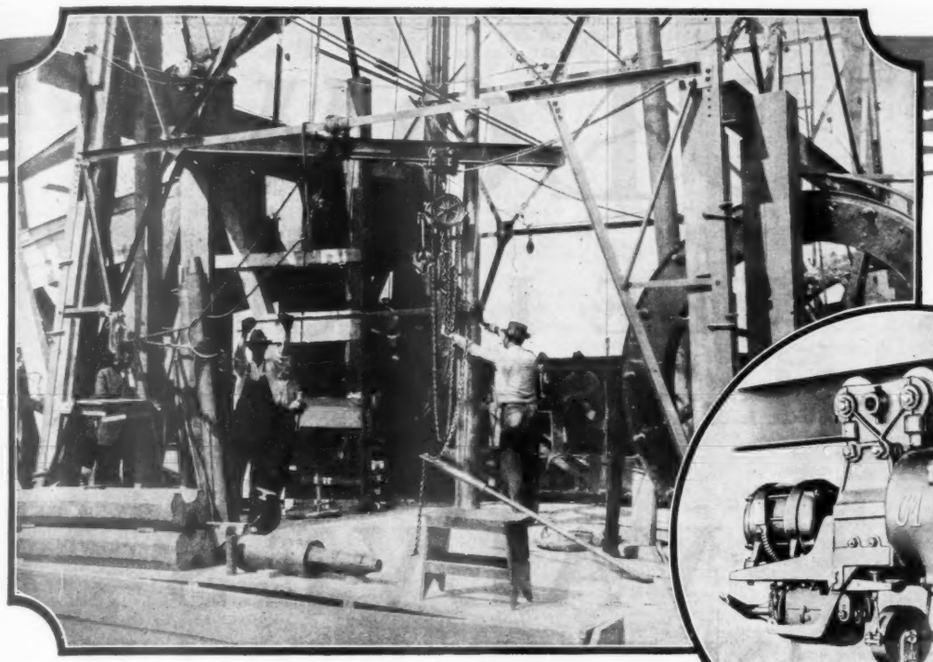
I am a firm believer in constant contact with all operators, either personal or by letters and bulletins, and I have tried to build up, from the starting of our department, a contact which would really mean something to each operator and every month every car or truck operator is written, showing him the expense of operating his equipment for the month and for the year up to that time. Our experience has proven that men in each locality compare these costs and try to operate their equipment as economically as the other men operating like equipment. In this same letter, we try to show whether or not he is doing as well as other operators and a great saving is being effected in this manner.

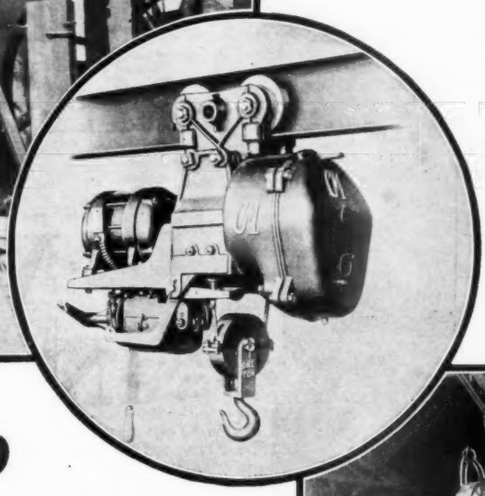
This is why I believe that an association like the Petroleum Motor Transport Association (whose plan I will outline later) can accomplish more than the A. P.I., as we get together every two weeks, talk over our ideas, and take action, while with a national organization, you meet once a year and from that time on, everything is done by letter. It is my thought that if a number of organizations like our little association were formed and all report their activities regularly to the A.P.I. or similar head, that a national good could be accomplished. I believe the greatest need is for each locality or business or branch of a business to solve its own problems and through these local associations, take definite action and report to the national head. It seems to me that most of the national organizations have a setup similar to this.

Now, just a word in connection with the Petroleum Motor Transport Association of Oklahoma and its activities. This association was formed in Tulsa less than a year ago. Its membership is composed of motor transportation men of petroleum or oil companies exclusively. All our problems are the same and a big saving has accrued to all affiliated companies. We adopted a diamond shaped emblem in the beginning, with P.M.T.A. worked into it, and a uniform bulletin of its use and purpose was worked out. All companies sent the bulletin or instructions to their car operators, together with emblems. These were placed on the radiators of all company cars and like magic, conditions throughout the field changed. Truck drivers who used to be cursing each other all had received the same instruction. They all knew that there was a desire for co-operation with all the other companies bearing this emblem and instead of cursing or crowding you off of the road, a salute of extension of road courtesy was extended after the distribution of these emblems. The instructions set forth that in case of trouble, you could stop any car with the emblem on it, and get whatever assistance was practical for it to do for you, without any charge. This eliminated some abuses practiced by unscrupulous drivers who, when the rain came, would charge $1 or $2 to help you out of the mudhole and some drivers did real well at this. Some very interesting stories of co-operation have been related in connection with this emblem. Then, again, we find that the truck and teaming contractors issue instructions to their men never to pass up a truck or car bearing this emblem and never to make a charge for any courtesy extended.

Another thing we have standardized on, is the truck and teaming contractor's rate of pay, load and mileage which constitutes a team day and a saving of one-eighth is the net result and by the way, the contractors are perfectly satisfied as they now know before they start what the rate is and it eliminates the "pay off" which we have heard did exist.

This association has a number of other standardization plans, also plans for the education of truck and car operators. We realize our big problem is educating the truck driver and we are laying the foundation by adopting the emblem, the standard team load, and standard tool equipment as means to an end. We are getting the drivers to consider the other fellow and now we are going to get them





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All the leading oil well equipment jobbers in your territory handle the C-M Matchless Derrick Crane, the Model K Cyclone, the C-M Electric Hoist and the rest of the complete line of C-M overhead material-handling equipment. The savings in time, money and effort will be a pleasant surprise.

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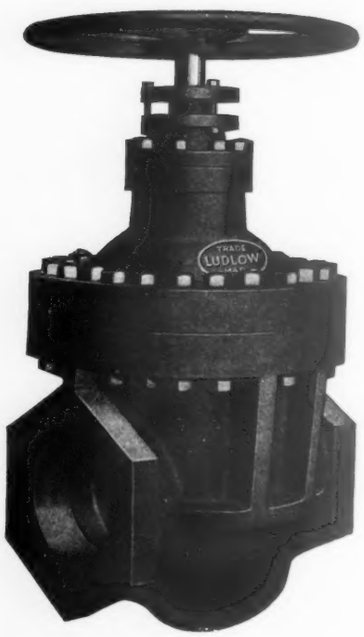

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to consider their equipment. I want to say that my experience has been that there is a noticeable change in my truck drivers' care of their equipment, due, I believe, in a measure, to their seeing other companies' equipment with a shining radiator and a neater general appearance. We members are all sending out a uniform letter in our educational campaign and are going to hold examinations after a series of letters have been sent out, and also make examinations of the equipment in the field—all with the view of showing our men that we are taking seriously the information we are passing on to them.

In closing, I wish to say, if I were asked what we might do in a national way, my first answer would be: Educate the man behind the wheel as to the proper handling and care of his equipment; Second—Standardization through the city, county, state, nation, or other political subdivision on road laws as to signals, turning, backing, or otherwise changing course, also as to speed laws, stop signs, parking rules, time limits, and the like. There is no such thing as "It can't be done." If you will analyze the railroads you will find that whether you are on the East Coast or the West Coast or some intermediate point, the same system of rules govern and control. Here we are with a mounting death list, accidents by the thousands, destruction of property mounting into the millions, and no national legislation being actively urged or demanded which would prevent this wholesale slaughter of the innocent. Of course, this perhaps would not be such a good vote getter as a political issue but what Senator or Representative would dare to take a stand against its importance.

Third—The many things which we can standardize in the manner of our equipment, speed, signals, and even wages, are the important issues to my mind, always realizing nothing is accomplished with "Can't" in it. This element must always be taken out of successful accomplishments. In meetings of this kind, "excuses" are the answer for "nothing accomplished."

NATURAL GASOLINE AS CHEMICAL MATERIAL

(Continued from Page 62)

paraffin hydrocarbons is extremely difficult and expensive, should consider that the difference in boiling points is very great on the light end of the series and that the number of isomers is smaller. Existing large-scale installations of several companies are now easily and continuously making butane and propane for their own purposes of vapor pressure control in motor fuels with a boiling point of 10 degrees Fahrenheit or less. While it is true that the highest degree of purity is difficult to obtain, commercial purity, of the order of that obtained with other liquids of commercial large-scale use, is now available in tank-car lots. If any of you want to buy a few tank cars of propane or butane per day, you may be surprised to find how many manufacturers are prepared to sell them to you, and the I. C. C. rules are already made and containers developed and in actual use.

Commercial Significance

The use of these hydrocarbons as a specialized fuel is a reality today. The gas is available because nature has prodigiously provided it. Everywhere, save in one place, gaseous B.t.u. is more expensive than liquid or solid B.t.u. Only in the old field is gaseous B.t.u. cheaper. It cannot always be stored, nor piped in large quantities from every field; it would be uneconomic. But it can be tanked and shipped to almost any point, and compete as a special fuel in special industries, and in many places instead of gas in its domestic application. The more ideal uses are in the hands of the chemists.

What does not appear practical today will be made practical tomorrow by greater absorption of the teachings and the work of Blau, Garner, Burrell, Thompson, Campbell and others, and perhaps by co-operative research and development. Instead of accomplishing what has been called "stabilization at a loss" by evaporating light fractions, it is written into the future that stabilization will become, rather, an "effect" instead of "cause"—that stabilized gasoline (finished motor fuel) will be the residue after the raw material has been broken down and looted for valuable constituents. Natural gasoline in the hands of the initiated will be a chemical material.

STATE AND MUNICIPAL TAXATION PROBLEMS

(Continued from Page 113)

with less than six figures. Compilations of merchandise inventories as returned to rating houses as contrasted with the returns for purposes of assessment reveals that 25 per cent of assessed to actual value is a high average ratio for any taxing jurisdiction. As a rule the ratio hovers around the 10 per cent mark. I am satisfied that there is no member of the industry which maintains a ratio as low as 25 per cent of assessed to the actual value of its merchandise, and many are returning as high as 80 per cent of actual value. The same is true of excise taxes levied upon capital stock or total assets by the state direct. Improper reports are constantly being filed whereby the corporation is paying in excess of the amount contemplated by law. State officials ordinarily extract the check from the return and if the payment is in excess of the requirements of law they reason that if the taxpayer does not know enough to figure his tax correctly that that is his business and they accept the check.

The same is true of all standardized equipment, real estate and improvements. As many values are returned as there are oil companies. Almost invariably the assessor and boards of revenue equalize all of the returns by increasing the lower to the highest. It often happens that the highest valuation is above actual present value and is always in excess of the prevailing ratio of assessment in that locality. By this process the property of the oil industry is being assessed higher and higher over an ever-widening area. I have no doubt but that the property of the industry generally is assessed higher than that of any other industry in the country. This deplorable situation can only be remedied by attention and co-operation.

What Shall Be Done?

All of which is true, I hear some critic say, but what are you going to do about it? First of all I would secure co-operation among the members of the industry—co-operation mind you, not conspiracy. Co-operation for mutual benefit as the various other groups of the modern business world co-operate for mutual benefit. I would create some means of distributing useful information among the members—a clearing house if you please where information could be exchanged.

I would have the entire industry resist every proposed measure levying an unjust tax burden as I would have it resist every unjust assessment under existing law. Experience tells me it pays. It is my policy to file valuations at the prevailing ratio of assessed to actual value in that particular taxing district. If there is an increase of $300 or more in any schedule so filed, it must be reported by the field man to the general office and a protest made to the assessing official or board making the increase. Taxing officials in our territory have long since discovered that if they increase our schedules, they have a long, though it may be a good-natured argument on their hands.

I would adopt the same policy with legislatures and state officials generally. I would protest every unfriendly measure from the time it was formulated until such time as the governor had made it a law by his signature. If it then appeared to be an illegal one, I would protest it in all the courts until its validity was determined. A fighter is usually respected and if contests are argued with good nature and diplomacy, there is little danger of alienating public sentiment. I have conducted a good many fights against undesirable legislation and have contested the resulting laws in the courts, without any loss of public favor. A fair and tactful handling of public officials will get results in 95 cases out of 100.

The law of the jungle should no longer govern the members of the oil industry. The claw and the fang should be turned against the aggressor and the common right defended and maintained with courage and without falter or compromise. In this direction lies immense economic advantage.

PREVENTING ACCIDENTS IN THE OIL INDUSTRY

(Continued from Page 110)

his work. A short while later he fell to his death. Evidence showed that the foreman knew that the worker had removed the hand rail and as he had permitted the man to proceed with his work without the protection, the employer was guilty of permitting an employe to work under unsafe conditions. The additional penalty was awarded to the dependents of the deceased, although it was the deceased who had committed the act of removing the hand rail.

That results are being obtained in prevention of accidents is proved by Reports of Investigations—Bureau of Mines, Serial No. 2,814—Fatalities in the California Petroleum Industry During 1926, by H. C. Miller. From this paper figures have been taken which show a gradual decrease in fatalities from 1923 to 1926, there being 57.6 per cent fewer fatalities in 1926 than in 1923. The following table shows the yearly decrease in fatalities and the number of fatalities per 100,000,000 bbls. of oil produced.

Year—	Fatalities	Barrels oil produced	Fatalities per 100,000,000 bbls.
1923	59	263,728,895	22.3
1924	44	230,063,117	19.1
1925	31	230,147,342	13.5
1926	25	224,117,013	11.2

In as much as there must be a direct relationship between the prevention of personal injuries, and the prevention of property damage by accidents, it is at once apparent that a reduction of 57.6 per cent in the fatality rate also means an enormous saving in property as the indirect outcome of the safety work which reduced the fatality rate.

Prevention Pays

As accidents do cause a great economic loss, preventing them does pay dividends.

The following are approximate figures covering the industrial accident costs (personal injuries) of four companies for one year:

No. of employes	Industrial accident costs	Costs per payroll employe
6,000	$64,000.00	$10.66
9,000	134,000.00	14.88
1,800	68,000.00	37.77
9,000	500,000.00	55.55

The first two companies have been very active in accident prevention work for several years. The others have recently become active in the work and a comparison of the costs of the four companies reveals the savings effected in claims costs.

A great single instance of life saving due to the effects of accident prevention work was seen in the case of the rescue of 11 men at one time from hydrogen sulphide gas. All the men were unconscious and apparently not breathing but the plant first aid team responded to the call and by means of artificial respiration restored breathing to 9 of the 11. Two were lost. Is there any need of asking the question, "Does this kind of accident prevention work pay dividends?"

Hazards Eliminated

Usually, it is too late to save life or prevent injury after an accident has occurred. However, the safety engineer, through his knowledge and effort, is actually eliminating thousands of hazards which cause injuries and even catastrophies. For instance, in a building in a refinery a number of centrifugals were running at 15,000 R.P.M. and handling a naphtha solution at a temperature of 20 degrees below zero. Frequently at an elbow in the run-down line the solution would freeze and cause a spill at the look box. It was the contention of the safety engineer that whenever one of these spills occurred there was an accumulation of a flammable gas near the floor. The belt idlers on the highspeed centrifugals had been known to jump off and skid across the floor leaving a trail of sparks behind. This led the safety engineer to the thought that if the vapor combination ever happened to be just right when a belt idler jumped off and skidded across the floor, an explosion and fire would follow and many lives would be lost. Accordingly, after a spill tests for gas were made and it was found to be present in dangerous quantity.

As a result of this investigation and test an inexpensive change was made in the run-down line. An elbow was eliminated and the run-down line was provided with a steam jacket. There were no more spills at the look boxes, no more shut-downs to thaw out the run-down line and the solution is now being handled at 32 degrees below zero without interruption. This is a good example of preventive work in which production is speeded up and operating efficiency increased.

It cannot be denied that the compensation cost of an industrial accident is much less than the loss sustained through its detrimental effect upon the morale of the workers and the slowing down of operations.

Avoiding Injury

The thought of preventing accidents has caused many managers, superintendents and foremen to replan their work which has not avoided injury to workers but has speeded up production. Today we have standard scaffolds for certain jobs. When the crews go on a job the workers do not stop and debate about the number of uprights, braces, or walk planks that the scaffold is to have and then erect a scaffold of uncertain strength. The crews have the blueprints for the scaffold and go ahead and put it up according to specifications and are then able to proceed with their other work with full knowledge and assurance that the scaffold is safe. Proper scaffolds have been a very influential factor in reducing the number of construction accidents.

The mechanical division of about 500 men in one of the refineries has recently gone six months with only one lost time accident. This has been accomplished by establishing safer working conditions, and safer practices. The men have responded because the manager, superintendent and the foreman believe that safety is a part of every job, and they know it. Only a short time back it was considered next to impossible to prevent accidents in the mechanical department.

Accidents are costly, they can be prevented and by preventing them money is saved, costs are lowered, frequently production is speeded up.

Proper selection of men, medical examination, and instructng the new man when he is put to work are great factors in preventing accidents. In the case and can house and drum shed of one of the refineries a great deal of trouble with sprained backs and hernias had been experienced. These complaints have practically been eliminated by placing husky, physically-fit men of 25 to 30 years of age on these jobs. When these men report for work they are directed to look over a series of photographs which have been posted at the entrance of the drum shed and which show the proper methods of handling cases and drums. If a worker is later on observed doing his work incorrectly he is sent back to take another look at the photographs.

An interest is being taken in the new employe which precludes the jokes which formerly were played on him. This interest is the direct outgrowth of the desire to prevent lost time on account of injury and to interest the good workman so that he will become a permanent employe.

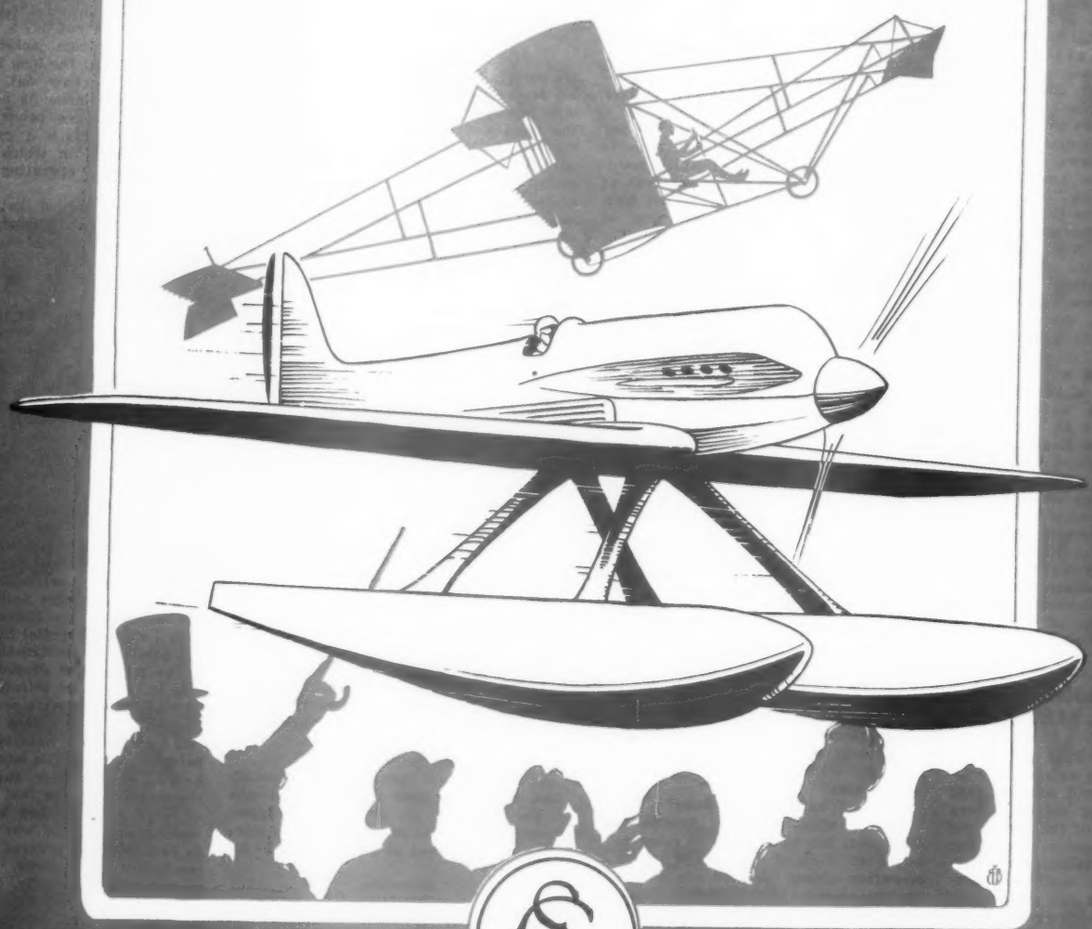
Periodical reports of inspection of equipment signed by the safety engineer or the man in charge of the equipment are found beneficial in keeping working conditions safer.

Placing Responsibility

Investigation and definitely placing the

(Continued on Page 147)

THE NEW ERA



The struggle to conquer the air was in the beginning a matter of aeronautics. The initial problem of air foil and aerial dynamics first engaged the minds of the intrepid pioneers who were contented with light motors sufficient only to lift the plane from the ground. Speed and motor efficiency later became the factor in advancement and developed steadily to finally achieve the astonishing record of over three hundred miles per hour and a sustained flight of over fifty hours in the air.

The new era has now enlisted the aid of scientific fueling. Chestnut and Smith Corporation, manufacturers of Natural Gasoline, were the first to realize this need and were successful in developing NATURALINE, the super-aviation motor fuel which through exhaustive test and experiment has demonstrated its superiority. It is forty-six pounds per hundred gallons less than U. S. fighting grade gasoline—is exceedingly high in anti-knock qualities and eliminates "gas-lock" and the formation of carbon.

NATURALINE is making the air safer for humanity.

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NATURALINE
A SUPER AVIATION MOTOR FUEL

CANADIAN FIELDS

(Continued from Page 48)

production for 1927 will exceed that of 1926 by approximately 100,000 bbls. In 1926 the Alberta production amounted to 217,088 bbls., approximately 60 per cent of the entire Canadian production, which aggregated 364,603 bbls. for the year. The Turner Valley production for the year ending October 31, 1927, is estimated at a little more than 300,000 bbls., which total is made up of the following items: Crude naphtha, 276,500 bbls.; light crude oil, 25,500 bbls.

To this can be added a heavy crude production of around 2,250 bbls., partly from the Devenish No. 1 well in the Skiff Field, and partly from the wells in the Wainwright Field. With the increasing crude naphtha production from the Royalite No. 4 in the Turner Valley Field, supplemented by the new production from Royalite No. 7, the Turner Valley figures for the past two months of 1927 should run considerably over the average for the rest of the year; which would likely bring the Alberta production for 1927 to between 310,000 and 320,000 bbls.

Three drilling outfits in the Turner Valley Field were recently put out of commission, two by fire and one by high winds. Stockmen Oils No. 1, LSD 1-2, Section 27-20-3w5, at last reports was still burning. The first started following an explosion which occurred some hours after the 10-inch casing had been lifted sufficiently to bring back the original gas flow to close to 3,000,000 feet a day encountered at about 1,560 feet. The derrick and buildings were completely destroyed, with estimated damage between $15,000 and $20,000; the derrick and equipment was insured for $11,000. The derrick will have to be rebuilt to finish putting the gasser on a producing basis. Five drillers and two children, who were injured by the explosion, are recovering. At last reports the gas was still coming from the casing and making its way up through 20 feet of wreckage in the cellar, the flames lighting up the field for miles. The well itself is apparently in good shape. The damaged boilers are being repaired and steam will be used to put out the fire. As soon as No. 1 well has been got under control and brought into actual gas production No. 2 well will be started. No. 2 was located some time ago in LSD 7, Section 27-20-3w5; but it is possible a new location may be made. Gas from No. 1 will be used for drilling, and will also be supplied to the Seneca Oil Co. test in LSD 1, Section 34-20-3w5. The latter is cemented at 3,180 feet.

Fires in Turner Valley

Royalite Oil Co.'s No. 8, LSD 9, Section 12-20-3w5, caught fire on November 25. The Royalite fire brigade was unable to control the flames, but considerable of the equipment was salvaged. The derrick was pulled over before it finished burning, as a safety precaution. The blaze apparently originated from an overheated stove in the boiler house. The well was at 2,630 feet, but the tools were not in the hole. The derrick is being rebuilt and the test is expected to resume drilling early in December.

Advance Oil Co.'s No. 5, LSD 16, Section 19-19-2w5, was rigged up ready to spud in when a strong wind wrecked the derrick. The derrick in falling cleared practically all the equipment, so that little damage was done the machinery. None of the rotary drill stems were in the rig at the time. The derrick is being rebuilt, and the test is expected to spud in early this month.

Royalite Oil Co.'s No. 7, LSD 3, Section 13-20-3w5, has been placed on the pipe line but production figures are not yet available. The production comes from the wet gas horizon in the Madison limestone at 4,208 feet. Royalite Oil Co.'s No. 9, LSD 6, Section 13-20-3w5, is at 1,665 feet and drilling. Royalite No. 10, NE Section 12-20-3w5, is drilling at 843 feet.

Dalhousie Oil Co.'s No. 1, LSD 4, Section 18-20-2w5, is installing the diamond drill outfit which was used to bring in Royalite No. 7. Dalhousie No. 1 was cemented in the top of the Madison lime at 4,357 feet, and should be in production by the end of the year. Dalhousie No. 5, LSD 16, Section 30-19-2w5, is at 4,665 feet and drilling. Dalhousie No. 6, LSD 10, Section 13-20-3w5, is at 4,517 feet and installing the rotary outfit; it is expected to resume drilling early this month and should get production within a few weeks. In the north end of the Turner Valley, Foothills Oil & Gas Co.'s No. 1, SW Section 26-20-3w5, has a fishing job at 3,497 feet. Home Oil Co.'s No. 2, LSD 14, Section 20-19-2w5, is reported drilling around 3,150 feet.

Dolomite Co. Sold

A meeting of the shareholders of the Dolomite Oils, Ltd., held at Calgary recently approved the proposed sale of the company's assets to the Foothills Oil & Gas Co., a subsidiary of Imperial Oil, Ltd., operating in the north end of the Turner Valley Field. Dolomite Oils, Ltd., has No. 1 well, LSD 8, Section 1-20-3w5, standing at 1,800 feet; the well was shut down last January, and since then has drilled only a couple of weeks in September. This test is about 600 yards south of the McLeod producers. Dolomite Oils, Ltd., also owns E half NE, LSD 8, Section 13-19-2w5, about the same distance north of Dalhousie No. 5 production. The acreage, though not very large, is thus well located. Details of the actual terms of the transfer have not been given out, but it is understood the Foothills Oil & Gas Co. will pay $35,000 cash, primarily to wipe out the outstanding obligations of Dolomite Oils, Ltd., and also exchange Foothills stock for Dolomite stock on the basis of one share of Foothills for 15 of Dolomite.

Dolomite Oils, Ltd., was capitalized at $750,000 in $1 par shares, of which 250,000 were offered, but the issue apparently was not all taken up. Foothills stock is selling around $2.50 per share.

Foothills Oil & Gas Co., which has No. 1 well down 3,497 feet in SW Section 26-20-3w5, will complete the Dolomite well, LSD 8, Section 1-20-3w5, as Foothills No. 2. It is understood that drilling will be resumed this month. In addition, Foothills No. 3 will be located within a few weeks. The Foothills holdings in Turner Valley Field now approximate 2,300 acres.

Illinois-Alberta Oil & Refining Co.'s No. 1, LSD 14, Section 12-20-3w5, showed a production for the week ending November 19 of 753.2 bbls. of crude naphtha, compared with 752 bbls. the previous week, or an average of over 107 bbls. a day. Illinois-Alberta's No. 2, same LSD, diamond drill test, at 770 feet and drilling.

Drilling Resumed

Spooner Oils' No. 1, LSD 12, Section 13-20-3w5, has resumed drilling at 4,750 feet. The test is approximately 100 feet in the Madison limestone. Vulcan's No. 1, in LSD 11, same section, got its production at 140 feet in the Madison lime so that Spooner's No. 1 must be close to the producing horizon. Vulcan's No. 2, LSD 11, Section 13-20-3w5, is at 3,885 feet and drilling for 8¼-inch casing.

McLeod Oil Co.'s No. 1, LSD 16, Section 1-20-3w5, has a new derrick up to replace the one burned some weeks ago, and is installing machinery. The test will resume drilling at 3,090 feet.

Calmont Oils, LSD 2, Section 1-20-3w5, is at 4,210 feet and drilling with 8¼-inch casing carried down behind the tools at 4,193 feet. Okalta Oils' No. 1, LSD, Section 1-20-3w5, is at 4,200 feet and drilling, with the 8¼-inch casing at 4,118 feet.

New McDougall-Segur's No. 3, LSD 14, Section 12-20-3w5, has a derrick up for a test of the Dakota sand, and will spud in some time in December.

Notice has been given in the Alberta Gazette that the Monarch Oil Co., Ltd., and the North-West Drilling Co., Ltd., will be struck off the list of Alberta joint stock companies at the expiration of three months unless cause is shown to the contrary.

In the Highwood district, southern foothills, Imperial Oil, Ltd.'s Highwood No. 1, LSD 3, Section 36-18-3w5, is at 3,530 feet and drilling.

Moose Mountain

In the Moose Mountain district, Signal Hill Oil Co.'s No. 2, LSD 9, Section 34-23-5w5, is at 1,612 feet and underreaming to carry the 8¼-inch casing to the bottom of the hole. On the Morley Reserve, Gold Coin Oils, Ltd., is shut down for the winter at 3,928 feet. Wabash Oils, Ltd., at 300 feet is changing to a heavier outfit for the deeper drilling.

In the De Winton district, Anglesey-Lakeview's No. 1, LSD 1, Section 22-21-1w5, is reported at 1,600 feet and drilling. The test is just outside the town of De Winton, some 17 miles south of Calgary. One of the most complete drilling outfits in Alberta is used for the test, electric power being employed for drilling; it is planned to continue work through the winter. The test is being put down by the Marquis of Anglesey. The marquis arrived in Calgary recently from England, and is spending several weeks looking over the drilling operations and other interests in the Canadian West. J. F. B. Kitson is drilling superintendent.

Pincher Creek

In the Pincher Creek district, southwestern Alberta, Mount Royal Oil & Gas Co.'s No. 1, LSD 4, Section 7-6-1w5, is shut down close to 1,000 feet, with a strong flow of wet gas coming from the 15-inch pipe. The drillers are roofing in the boiler house and making the camp habitable for the winter run. South of Pincher Creek, the Alberta Gas & Oil Co., a Henry L. Doherty subsidiary, is constructing a camp near Waterton Lakes Park. The Doherty headquarters will be at Hillspring, and it is understood two tests will ultimately be drilled. It is understood that the structure being tested by the Doherty interests was originally mapped by Imperial Oil, Ltd., geologists, and that the latter company owing to the long distance from the railroad moved its Pincher Creek operations some 30 miles further north and west, to the Twin Butte area. In this Twin Butte district, Imperial Oil, Ltd., drilled two tests. Imperial-Twin Butte's No. 1, NE Section 14-4-30w4, was abandoned at 2,780 feet and No. 2, SE Section 20-3-29-w4, was carried to 4,375 feet, being at that time the deepest test in Canada. No. 2 is reported to have got some gas, but no oil showings were encountered. With these tests, Imperial Oil, Ltd., abandoned the Pincher Creek area and surrendered its leases. In addition to difficult transportation problems under the best conditions, the Doherty operations are being seriously impeded by heavy snowfalls.

Further east, in the Skiff Field, Devenish Petroleum's No. 1, LSD Section 27-5-14w4, is being brought back to production at the 3,090-foot horizon, where a bailing production of 250 bbls. a day of heavy crude was secured in the Ellis.

In the Warner district, Gas Production & Transportation's No. 1, NE Section 21-4-18w4, is at 1,800 feet and drilling in a brown shale. Additional 12½-inch casing is being hauled to the camp. In the Cypress Hills district, Eagle Butte's No. 1, LSD 3, Section 31-7-4w4, is reported setting 15½-inch casing at 1,150 feet.

In the Wainwright Field, east central Alberta, the Price Oil Development & Refining Co. has postponed erection of its proposed refineries at Wainwright, Alta., and Vancouver, B. C., till next spring. Experimental work has been carried on with the use of the heavy Wainwright crude for the manufacture of lubricants, and it is announced that a small plant for the production of lubricants will be built this winter at Wainwright.

In British Columbia, the B. C. Oil Co. is drilling a test in the Sage Creek district, just north of the Montana boundary. The location is in the Rocky Mountain foothills. In the earlier stages the test had some trouble with caving formations, but these have been overcome. It is planned to continue drilling into the winter; sufficient food was hauled in this fall to last the camp till next spring, and coal is secured from a mine recently opened about 8 miles from the well. S. C. Ferdig is handling the drilling contract, the test being financed by Vancouver capital.

On the Montana side, a test has been located by the Calgary-Sunburst Oil Co. in Section 8-35-2w, about 6 miles east of Sunburst at the northern edge of the Kevin-Sunburst Field. Drilling is in charge of J. F. Bradford of Calgary and a rig will be used.

Ontario Fields

In the Ontario fields, Union Natural Gas Co. has finished No. 19 well, Mackie farm, Dawn Township, Lambton County, securing a small gas production in the Dawn sand at 1,645 feet. Union Natural Gas Co.'s No. 20 is drilling in the same field. No additional drilling in the Dawn area will be undertaken this season.

In the old Tilbury Field, Kent County, the Union Natural Gas Co. has finished No. 276 on the Radmor farm, Talbot Road, Romney Township, with a small gas production. Union's No. 277 on the Nick Baldwin farm also proved a small gasser in the Tilbury sand. Union's No. 278 has been started on the Radmor farm and No. 279 on the Shanks farm.

In Dover Township, Kent County, Ajax Oil & Gas Co. is reported drilling at about 1,500 feet on its Trenton test on the G. Reaume farm.

ROCKY MOUNTAIN AREA

(Continued from Page 48)

its No. 2 State, Section 36-43-95, in red shale at 2,350 feet. Two new locations will be made by this company on this structure in the spring. It has several black oil wells completed and shut in.

La Barge

In the La Barge district in southwestern Wyoming, M. J. Goldberg's No. 1 SE NE Section 16-26-113, is rigging up. This well is an offset to the Texas Production Co.'s No. 1 Davis in Section 15 which swabbed 40 bbls. from a total depth of 830 feet. The Davis well is being tubed for pumping. The Goldberg well is intended for a deep test and will be carried down to 3,500 feet if necessary. A. R. Cobb has the contract. California Petroleum Corp.'s No. 6-J Section 34-27-113, is drilling at 370 feet; No. 2-I, Section 3-26-113, is testing cement at 1,163 feet; No. 7-E, Section 34, is drilling at 780 feet; and No. 4-A Section 34, is drilling at 695 feet. No. 7-G, the deep test, is standing and probably will not resume before spring. Wolff Oil Co.'s No. 3, Section 3-26-113, is underreaming the 8¼-inch at 900 feet. Wyoming Producers Oil Co.'s No. 1, SW Section 29-28-113, is drilling at 1,650 feet. W. D. Newlon's No. 1 SW Section 12-26-113, is drilling at 1,473 feet. A. H. Squier's No. 1 NE SW Section 33-27-114, is underreaming the 5⅞-inch at 1,450 feet. Elkhorn Oil Co.'s new test in the SE Section 17-27-113, is moving in material. Consolidated LaBarge Oil Co.'s No. 1, Section 8-25-113, is spudding. Reece Oil Co.'s No. 2, NW, Section 27-27-113, is fishing for underreamer lug at 510 feet. J. Minton's No. 1, Lot 1, Section 4-26-113, is spudding and his No. 1, Section 9-27-113, is waiting for materials. Associated Producers' No. 1, Section 35-27-113, is drilling at 1,520 feet.

Oregon Basin

In the Oregon Basin Field in Park County, there is little in the way of news outside of routine operations. Cody Petroleum Co.'s No. 1 Klindt, NW Section 7-51-100, is drilling below 3,200 feet and its No. 1 Garner, NW Section 28-51-101, is drilling at 2,300 feet. Ferdig-Wyoming's No. 2 Hough, SE, Section 19-51-100, is drilling at 2,300 feet. Linco Oil Co.'s No. 1 Rosseau, NW Section 35-51-100, is drilling at 1,365 feet; No. 1, Section 24-50-101, is shut down at 1,015 feet waiting for rotary; No. 1, Section 13-50-100, is shut down at 1,010 feet while rotary is being erected. Fred G. Otsland's No. 1 Rousch, Section 9-51-100, is installing electric rotary at 2,086 feet; and his No. 1 Shaw, Section 18-51-100, is drilling at 1,540 feet. Ohio Oil Co.'s No. 1 Batson, Section 6-50-100, is drilling at 546 feet; and its No. 2 Wilson, Section 5-51-100, has rig completed. Continental Oil Co.'s No. 1-A State, Section 16-51-101 is drilling at 1,010 feet, and Producers & Refiners No. 1 Frisby, Section 32-52-100, is redrilling at 210 feet. Yakima

Oil Co.'s No. 1, NE Section 23-51-101, is standing at 508 feet waiting for rotary equipment, and Wolverine Oil Co.'s No. 1 Rue, SW Section 28-51-100, bottomed at 640 feet, is rigged up rotary equipment. Other Park County operations include the following: Yodoc Oil Co.'s No. 1 Horse Center, NE Section 6-51-101, drilling at 800 feet. Fred G. Ostland's No. 1 Half Moon, SW Section 23-51-102, drilling at 1,540 feet. Ohio Oil Co.'s No. 1 Pulley, on the Shoshone Anticline, Section 27-53-101, drilling at 1,783 feet. Honolulu Oil Co.'s No. 1 Four Bear, NE Section 29-48-103, is drilling at 2,775 feet and same company's No. 1 Pitchfork, NE Section 14-48-102, is a location. Hoodoo Oil Co.'s No. 1, NE Section 36-51-101, is spudding. Union Oil Co. of California's No. 1 Taylor, NW Section 22-47-101, is drilling at 2,840 feet.

Utah

Utah Southern Oil Co.'s No. 1 Frank Shafer, Section 6-27-21, Cane Creek Dome is still endeavoring to bring back production at the 2,025-foot horizon. This week the well pumped several hundred barrels of fluid daily, about one-fourth oil. The problem is proving a difficult one as every time the gas pressure begins to increase it precipitates salt and causes the channels to close up. The operators are considering the placing of a heavy shot to shatter the casings at the horizon so as to open up a better channel for the fluid. One difficulty is the lack of knowledge of the condition of the hole as it was subjected to heavy abuse for many months in a former effort to shut off the water. The fluid is coming through a perforated casing and, apparently, around the bottom of another string that was set below the horizon but which did not, as far as can be determined, make a shutoff. H. W. C. Prommel, who first mapped this structure and who has held tenaciously to the salt dome theory, is convinced that the oil in this well is coming through a fracture in the salt, this fracture being several hundred feet wide, and not caused by any displacement such as would result from faulting. The presence of the oil and gas pressure after the water had stood for a year and a half he considers an indication that the oil and gas are coming through this fractured zone from some other point and that the water has been precipitated from the salt. By drilling along the line of this structure he expresses the belief that the source of the oil could be located.

Utah Southern Oil Co.'s No. 1 Canyon, Section 18-41-19, East Anticline, San Juan County, is drilling below 1,400 feet. Midwest Exploration Co.'s No. 1 Early, Section 13-4-6, Duchesne County, is running 8¼-inch casing at 2,595 feet. Total depth is 2,870 feet. Union Oil Co. of California is storing equipment used at its Lisbon Dome test and probably will use it in the spring to drill a flank test on the same structure. Boulder Knoll Oil & Gas Co.'s No. 1 Section 17-34-25, San Juan County, is reaming to lower 10-inch casing to 2,000 feet. Texas Production Co.'s No. 1 Shipley, Section 5-27-14, Sweetwater structure, is drilling at 1,000 feet. Midwest Refining Co.'s No. 3 Ashley Creek, Section 23-5-22, is on top of the big gas sand in the Morrison at 1,655 feet, and will lower 10-inch and cement it before drilling in. The objective is the Sundance expected at around 1,900 feet. Diamond Oil Co. is ready to spud in the NE Section 29-8s-5e, in the Diamond Fork district. Phillips Petroleum Co.'s No. 1 Section 16-27-16, on the Barrier Creek Anticline in Wayne County, is building derrick.

Montana

Owing to the recent cold and heavy snow in Montana, the Kevin-Sunburst Field reports no new holes started, and only a few completions. The Hardrock Oil Co.'s No. 6 Abell reports oil in the hole from the Sunburst sand and will probably make a producer from that horizon; but as the tools are lost in the hole no test can be made at this time. The National Oil Co.'s No. 4 Harte found oil and water below the Ellis-Madison contact, and has about 600 feet of fluid in the hole of which approximately 50 per cent is oil. Drilling will be continued. The Ohio Oil Co.'s No. 5 Schact found sulphur water at the base of the Ellis and is still drilling. The Hibbings Faunce well, which was plugged back and shot, does not look very promising, but will be given another shot before being abandoned. The Ohio company's No. 5 Emmert has been shot twice and is cleaning out. The Landry Wilcox well failed to look better after shooting and will be saved for a gas well.

While no exact figures are available, the production of the Kevin-Sunburst oil field is expected to show a falling off from the peak reached in 1926. During that year the field produced almost 6,500,000 barrels of oil, while the 1927 figure will probably fall below 5,000,000 bbls. The Cat Creek Field will likewise show a decline in production. However, the total production will about equal the 1925 production and will exceed all years prior to 1925.

The Whiteside Syndicate well in Section 5-27-3, Pondera Field, is drilling below 1,890 feet and should be completed early in the week. This is the only well active in the field. In the Bannatyne Field, the Bannatyne Oil Co. well is down 1,400 feet and should also be an early completion. No. 2 Elliott, in the same field, is drilling at about 1,200 feet, but is much farther down on the structure and will not be in the sand for some time.

Rocky Mountain Association

The Montana chapter of the Rocky Mountain Oil & Gas Association will hold its annual convention in Great Falls on December 9 and 10. L. B. (Tip) O'Neil, president of the Montana association, will preside. Speakers will include O. A. Bergeson, former member of the Montana state tax commission; A. C. Rasmussen, collector of internal revenue; W. H. Price of Casper, district manager for Black, Sivalls & Bryson Co.; H. L. Fogleman, business expert of Chicago; Ralph Arnold, consulting geologist; G. G. Howard, geologist; Donald Campbell, counsel for the Midwest interests in Montana; Governor Erickson of Montana; and representatives of the California Petroleum Corp. and the Texas Pacific Coal & Oil Co., major operators in the Montana oil fields.

The newly organized Radigan Hungerford Oil Corp., capitalized at $1,800,000, last week purchased 280 acres of land in Sections 7-34-1 and 12-34-2 in the Kevin-Sunburst Field for a consideration of $500,000. Of this amount, $150,000 was paid in cash to the National Oil Co., owners of the acreage, and the remainder in stock. There are five producing wells on the tract with a total production of 600 bbls. daily, over 400 of which comes

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LA.-ARK. WILDCATS

(Continued from Page 55)

drilled 10 or 12 years ago due west and across Red River in Caddo Parish. Gas was developed by these wells, but they proved short lived.

Interesting Completion

Bossier Parish provided another interesting wildcat completion in Sales & Walker's No. 3 Bollinger in Section 30-23-11, about 2 miles east of Cartersville gas production. It swabbed 40 bbls. of oil on a five-hour test early in November and had been shut down at 3,091 feet waiting on standard rig with the bottom 8 feet in sand, and when put to pumping this week made 500 bbls. of fluid, 90 per cent salt water.

Ohio Oil Co. abandoned its Cootchie Brake (Winn Parish salt dome) wildcat, No. 1 Edenborn, Section 31-10-4w, 15 miles southwest of Winnfield, after penetrating about 70 feet of rock salt, total depth 2,680 feet. H. M. Roark found rock salt at 490 feet in his third test on the Southern Minerals Co. lease in Section 19-11-3w, 10 miles northwest of the Ohio location. Ohio Oil Co. also abandoned No. 1 Aaron B Land Co. in Section 32-23-16, Caddo Parish, a few yards east of the Texas line in the northwest corner of the parish. It had been standing temporarily abandoned since last June after drilling to 1,553 feet. The company has another well, No. 1 Thompson, in the same section, drilling at 3,020 feet as a test for the Trinity stuff found in Pine Island.

Pittsburgh Exploration Co. tested salt water and abandoned No. 3 Moore in Section 12-11-6, Franklin Parish, at 2,152 feet. Location is about 20 miles south of Richland Parish gas production.

West Carroll Parish's gas show in the Palmer Corp.'s No. 1 White, Section 2-10-10, was marred somewhat by the failure of another test 12 miles west and between the possible new gas field and Monroe proven territory, Phillips Petroleum Co. abandoning No. 1 Marion in Section 32-20-9 as a dry hole at 3,003 feet.

Abandon Efforts to Make Well

In Arkansas Genther and others gave up trying to make a well of No. 1 Stout Lumber Co. in Section 3-14-16, Calhoun County, about 12 miles north of Smackover production in Ouachita County, testing dry at 3,008 feet. A previous test at 2,329 feet also was dry. The Texas Company tested dry and abandoned No. 1 Alexander, Section 8-17-19, Columbia County, at 3,001 feet.

Greenwood Production Co. had a small gas show, about 500,000 feet in No. 1 Cooper & Ellerbe, Section 15-18-14, Caddo Parish, when the well blew out at 935 feet, but the show was mudded off and the hole is drilling now at around 1,200 feet. The depth of the show corresponds to the shallow gas in the Greenwood area due west across the parish and the well is in plain sight of oil company offices in Shreveport, being about 4 miles north of the city across the flat lands of Douglas Island and the Cross Lake watershed.

That another locality of Caddo Parish is to be prospected is indicated by leases on 1,550 acres being filed for record by F. E. Estes of Shreveport. The land is in Township 16, Range 15 and 12 to 15 miles southwest of Shreveport, between the old Bethany gas field straddling the Texas-Louisiana state line and Reisor, near where there has been more or less prospecting with numerous shows, but no production in commercial quantities. West of Plain Dealing in the northern part of Bossier Parish Hamiter and others have begun drilling No. 1 Hamiter, Section 10-23-13, about 10 miles southwest of production in the Bradley district of LaFayette County, Arkansas.

NORTH LOUISIANA

Bienville Parish

Lake Bisteneau Gas Co. is drilling No. 1 State, Section 16-16-10, at 2,289 feet. Louisiana Petroleum Co. is fishing for drill stem lost in No. 1 Hays, Section 18-16-5, total depth 2,326 feet.

Bossier Parish

Doern and others are coring No. 1 Bollinger, Section 9-22-11, at 3,076 feet. H. S. Goodwin had a blowout of an estimated 5,000,000 feet of gas and 5,000 bbls. salt water at 2,604 feet in No. 1 Curtis, Section 2-16-13. Walker and others' No. 1 Antrim, Section 28-22-13, is still shut down at 2,420 feet.

Caddo Parish

Following a test at 935 feet which showed for 500,000 feet of gas at 935 feet, Greenwood Production Co. resumed drilling No. 1 Cooper & Ellerbe, Section 15-18-14, and is down 1,050 feet. Ohio Oil Co. is drilling No. 1 Thompson, Section 32-23-16, at 3,020 feet. Tubbs and others' No. 1 Hines, Section 9-14-16, is drilling at 2,260 feet. Woodley Petroleum Co. cemented 4½-inch casing at 2,460 feet in No. 4-B Knight, Section 2-15-12. Woodley & Collins resumed drilling No. 1 McVey, Section 23-19-14, on which operations were suspended for two weeks when the pot blew up and killed two of the crew and injured four others, and are coring at 2,566 feet.

Catahoula Parish

S. D. Hunter's No. 2 Tensas Delta, Section 21-9-7e, is drilling shale at 2,702 feet. Lochnager Oil & Gas Co. replugged No. 2 Beasley, Section 26-9-6, and will perforate casing, total depth 3,318 feet. The hole was plugged back to 3,098 feet and casing whipstocked; No. 1 McMillan, Section 29-9-6, is drilling sand at 2,140 feet. Standard Oil Co.'s No. 1 Tensas Delta, Section 23-8-5e, is drilling gumbo and streaks of shale at 1,875 feet.

Claiborne Parish

El Dorado Chief Oil Co., whose No. 1 Jones in Section 8-20-6, has been carried as a location since September 28, is now a derrick. Magnolia Petroleum Co.'s No. 1 C. C. Lee, deep test in Section 16-22-8, is in hard shale at 4,505 feet.

DeSoto Parish

Benson Oil Co. has cemented 6⅝-inch casing at 2,770 feet in No. 1 Wolff, Section 3-10-13, and the forthcoming test, because of the performance of a wildcat drilled near by in 1920-21, will be watched with considerable interest. Dixie Oil Co.'s No. 1 Jenkins, Section 9-12-11, is drilling lime at 5,820 feet, one of two wells in this territory making hole below a mile from the surface. It has 270 feet to go before matching Gulf Refining Co.'s No. 18-C Willis Williams, Section 31-13-11, which tested salt water at 6,090 feet February 26, 1926.

J. W. Downey has made location and is rigging up on No. 1 Dickson, Section 24-14-13. Foster and others began drilling No. 1 Johnson, Section 7-10-13, and have 10-inch surface casing set at 107 feet. Magnolia Petroleum Co. is cleaning out No. 1 Logan, Section 17-10-12, total depth 3,265 feet. R. O. Roy has rig up on No. 1 Tracy, Section 3-13-13, and No. 1 Whitaker, Section 5-13-13, is a derrick.

Franklin Parish

Louisiana Petroleum Co. is on a rock at 1,600 feet in No. 1 Tensas, Section 11-11-6, and Barbour Oil Co.'s No. 1 Baker, Section 3-15-7, remains shut down at 2,960 feet.

Grant Parish

W. D. Ball and associates began drilling No. 1 Calhoun, Section 4-7-4w, November 18, set 110 feet of 10-inch casing for surface string and are drilling at 1,200 feet.

Natchitoches Parish

Lawson & Pharis' No. 1 Dave Delrie, the only well under way in the parish at present, is down 950 feet and drilling.

Rapides Parish

Collins Brothers' No. 1 Allen, Tioga Townsite well in Section 25-5-1w, is drilling at 800 feet.

Sabine Parish

Si Borden and others' No. 1 Logan, Section 36-10-13, is drilling at 1,867 feet. Dixie Oil Co.'s No. 1 Steinfelt, Section 20-10-12, which shut down last week after drilling 80 feet, has set 10-inch surface string at 100 feet and is drilling at 820 feet. L. M. Emlet's No. 7 Bowman-Hicks, Section 14-7-14, which tested a small amount of oil and salt water at 3,529 feet last week, drilled 4 feet deeper and is continuing its oil showing; No. 1 Mansfield Hardwood Lumber Co. in Section 15-7-14, began drilling second hole November 23 and has set 12½-inch surface casing at 120 feet.

Webster Parish

S. A. Lane's No. 1 Miles, Section 24-17-9, near Heflin, is making hole at 1,300 feet.

West Carroll Parish

Palmer Corp. is reported to have penetrated 16 feet of sand which developed a considerable show of gas at 2,450-66 feet, and is arranging to set 6-inch casing in No. 1 White, Section 2-19-10.

Winn Parish

Abandonment of No. 1 Sarah Edenborn, Section 31-10-4, by Ohio Oil Co., leaves but one well drilling in Winn, the same company's No. 2 Rolen, Account 1, in Section 5-12-1w, which is making hole at 3,000 feet. H. M. Roark's No. 3 Southern Minerals Co., in Section 19-11-3w, is shut down in rock salt at 505 feet, 6 feet in.

ARKANSAS

Columbia County

Big Creek Oil Co.'s No. 1-A Runyon in Section 3-16-21, 4 miles northeast of Waldo, which was abandoned some time ago after the promoters had drilled it to 800 feet, has been taken over by Sunny Jim Oil Co. of El Dorado and is being rigged up to deepen. Von Hagen Syndicate has begun work on two wildcats just over the state line north of the Spring Hill gas district of Webster Par-

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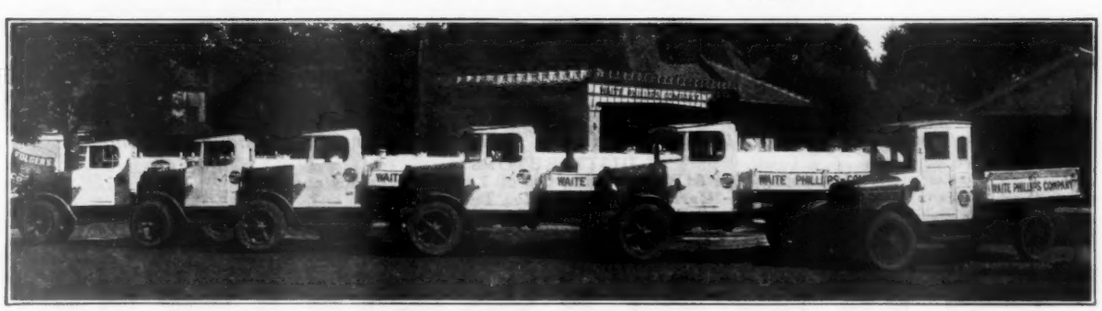

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ish, Louisiana. Rig is up on No. 1 Mason, 500 feet north and 500 feet east SW cor. SW SE Section 31-19-22. No. 1 Pickler, a mile north of the Mason, began drilling November 23 and has 12½-inch casing set at 200 feet. Location is 300 feet south and west NE cor. SW SE Section 19-19-22.

Lafayette County

Kensaw Syndicate's No. 1 Kensaw, Section 31-10-24, is washing to bottom, total depth 3,100 feet.

Miller County

Guest and others are shut down on No. 1 Saunderson, Section 14-15-26, total depth 1,713 feet. Lenz and others' No. 1 Mann, Section 22-15-26, is reaming to bottom, total depth 2,950 feet.

Nevada County

Second test of McDonald and others' No. 1 Pelt, in Section 9-15-22, at 2,000 feet was dry and the hole was drilled 35 feet deeper for another test.

Ouachita County

H. M. Harrell, trustee, is drilling No. 1 Ponder, Section 18-12-17, at 1,195 feet. Magnolia Petroleum Co.'s No. 1-B Stout Lumber Co., Section 28-14-16, is drilling hard lime at 3,082 feet.

Union County

Booth and others' No. 1 Rowland, Section 8-17-11, is drilling at 2,850 feet. W. R. Keever is waiting on standard rig to pump No. 4 Ezell, Section 12-17-15, which is standing 500 feet in fluid, 50 per cent water, from 6 feet of sand at 2,153-59 feet. Lion Oil Refining Co. has set 12½-inch surface casing at 148 feet in No. 1 Horn, Section 17-17-13, and is drilling at 1,450 feet. Pitcher and others lost No. 1 Arkansas Timber Co., Section 21-17-11, at 1,078 feet and have moved 100 feet west and are rigging up to start second hole on same well. Their No. 1 White in Section 17-15-19, is rigged up ready to drill.

EAST TEXAS

Shelby County

Magnolia Petroleum Co.'s No. 1 Pickering Lumber Co., W. J. Crane Survey, is drilling broken lime at 3,230 feet.

MISSISSIPPI

Alcorn County

Alcorn Petroleum Co. is drlling No. 1 Matthews, Section 14-2-7, at 649 feet.

Lauderdale County

Baker & Adkins' No. 1 Gunn, Section 13-7-16, is drilling at 2,435 feet.

Lee County

J. P. Evans has set 8½-inch casing at 1,200 feet in No. 1 Whitesides, Section 16-9-7, to cut off salt water. Lee County Petroleum Co.'s No. 1 Hickman, Section 12-8-6, is drilling at 950 feet.

Jasper County

King & Paulette have begun drilling No. 1 Thigpen in the NW SE Section 23-2-10.

Monroe County

Amory Petroleum Co. has a fishing job on No. 1 Hall, Section 8-13-17, total depth 2,404 feet. A. M. Sutton is changing to cable tools to continue drilling No. 1 Acker, Section 25-13-19, total depth 674 feet. Transcontinental Oil Co. and The Texas Company struck a water flow in No. 1 Day, Section 16-16-18, and are setting 8½-inch casing to shut it off.

SOUTHWEST TEXAS

(Continued from Page 56)

west and 2,100 feet to north line, is coring at 1,232 feet. Houston Gulf Gas Co.'s No. 14 Palacious is making location.

Alworth Pool

Alworth-Stevens-Hild are making location for test in the field, exact location not announced.

Aviator or Bruni Tracts—Webb

F. J. Bates' No. 1 Bruni, Block 47, located 150 feet to south and east lines, is drilling at 390 feet. Colon Schott's No. 1 Bruni, Survey 835, Block 3, located 900 feet to east line and 150 feet to south line, is drilling at 900 feet.

Cole Gas Field No. 2

Cole Petroleum Co.'s No. 36 Benavides, Survey 412, Block 14 located 159 feet to east line and 266 feet to north line, is fishing at 5,525 feet.

Carolina-Texas Field

D. J. Simmons' No. 2 de la Garza, Survey 335, Block 8, at 150 feet to south and west lines, is standing at 400 feet. Houston Oil Co.'s No. 3 S. Benavides, Survey 683, located 350 feet to north and 1,470 feet to east lines, at 3,003-8 feet is testing.

Mirando Valley Field—Zapata

O. W. Killam's No. 1 Benavides, Survey 12, Block 13, located 150 feet to southeast and 500 feet to northeast lines, is drilling at 500 feet; No. 1 Lopez Survey 75, Block 16, located 200 feet to south and 700 feet to east lines, at 1,631 feet is testing.

Luling Field—Caldwell

North & South's No. 1 Kelly is drilling in schist at 7,268 feet; No. 2 Tiller is also drilling in schist at 6,815 feet.

Kingsville Field—Kleberg

Houston Oil Co.'s No. 3 Kissman, Section 41, Block 10, located 500 feet to north and west lines, has derrick up. Humble Oil & Refining Co.'s No. A-4 Dennett, Section 39, Block 1, located 550 feet to north and 150 feet to west lines, has been spudded in.

Adams Gas Field—Medina

C. E. Lange and Jake Hammons' No. 1 Adams, Survey 71, located 500 feet to north and west lines of Block 20, is shut down at 60 feet. Pioneer Oil & Refining Co.'s No. 1 Adams, Survey 13, Block 1, located 300 feet to south and east lines, is drilling at 600 feet. Southern Gas Utilities Inc.'s No. 3 Schmidt, Survey 71, located 1,447 feet to west and 1,340 feet to south line, has set casing. Witherspoon Oil Co.'s No. 6 Nixon, Survey 119, at 2,750 feet to north line, has had derrick rebuilt after burning at 260 feet after gas blow out.

Refugio Gas Field—Refugio

Coast Gas Co.'s No. 2 Shelly is rigging up to deepen. Houston Oil Co.'s No. 5 Fannie Heard has set casing at 2,592 feet; No. 8 W. J. Heard is drilling in hard sand at 2,453 feet; No. 1 Smith Heard is rigging up to deepen; No. 11 W. J. Heard at 2,587 feet cored hard sand and is drilling; No. 2-A Rooke is drilling. Houston Gulf Gas Co.'s No. 1 Vance is rigging up to deepen; No. 3 A. W. Heard has set surface casing at 400 feet; No. 4 A. W. Heard is drilling at 2,010 feet.

White Point Gas Field—San Patricio

Houston Oil Co.'s No. 1 Humble is preparing to drill in; No. 3 Humble, Roos Survey, Block 7, has derrick up; No. 4 Humble same survey, Block 19, is drilling in gumbo at 1,910 feet; No. 5 Humble is location in same survey and block; No. 2 Ragsdale, J. N. Seguin Survey, has set casing at 453 feet; No. 3 Ragsdale same survey is location 1,200 feet north of No. 1. Mission Drilling Co.'s No. 1 Harwood is shut down at 2,786 feet; No. 1 Morris is standing at 200 feet; No. 1 Hunter is waiting on water; No. 3 Cage is location. Saxet Oil Co's No. 1 White Point Development Co. is location; No. 2 White Point Development Co. is drilling in shale at 1,230 feet; No. 8 Rachal is in sand at 2,331-35 feet; No. 9 Rachal is drilling; No. 12 Rachal is preparing to drill in at 2,312-16 feet; No. 10 Rachal has set surface casing at 400 feet and is standing; No. 7 Dunn is location; No. 9 Dunn is location; No. 1 Henry is location; No. 1 Hunter is waiting on water.

LOUISIANA-ARKANSAS

(Continued from Page 55)

at 3,078 feet in No. 3 L. & A., Section 15-23-12, total depth 3,087 feet.

Elm Grove and Sligo Districts—J. S. McCullough's No. 4 Hodges, Section 25-16-12, is waiting on standard rig, total depth 1,568 feet. The Palmer Corp. has rig up on No. 1 Lewis Burke, Section 26-17-12.

Caddo Parish

Pine Island District—Arkansas Natural Gas Co. is coring No. 1 C. W. Lane, Section 13-21-15, at 3,995 feet. Dixie Oil Co.'s No. 9 Clark, Section 14-21-15, is drilling at 3,510 feet and is trying to cut off a water flow at 3,909 feet in No. 9 Caddo Mineral Lands, Section 23-21-15. No. 92 Dillon, Section 13-21-15, is drilling shale at 1,360 feet. Its No. 4 H. H. Huckaby in Section 11-21-15, which blew in and caught fire two weeks ago, tested oil, gas and salt water at 2,742 feet whence the blow out came, and is arranging to go deeper. Double II Oil Co. No. 1 Wadkins, Section 27-21-15, set 10-inch surface casing at 37 feet and 6-inch at 1,365 feet. Gulf Refining Co. has gone back to No. 10 Herndon in Section 15-31-15, previously completed in the 3,600 foot horizon, to deepen to the new 3,900 foot stuff and is drilling at 3,848 feet. No. 14 Tyson, in Section 14-21-15, also a prior completion at the 3,600 foot level, is being deepened and is drilling at 3,763 feet.

Magnolia Petroleum Co.'s 8-A Hampton, Section 15-21-15, is drilling lime at 3,416 feet; No. 21 Robertshaw, Section 23-21-15, is coring sand at 3,890 feet; No. 22 Robertshaw in the same section is drilling lime at 2,776 feet. Ohio Oil Co.'s No. 25 E. K. Smith, Section 12-21-15, has passed the mile post and is drilling at 5,295 feet. It is the second well under way in this territory drilling below the 1-mile depth. The Palmer Corp.'s No. 1 Sellington, Section 17-21-14, is drilling at 4,101 feet. The Texas Company cored hard sand at 3,942 feet in No. 51 Caddo Mineral Lands, Section 23-21-15; No. 8 A. Herndon, Section 14-21-15, began drilling November 24, set 15½-inch surface string at 200 feet and is drilling at 1,745 feet; No. 9 A. Herndon, is a derrick 990 feet south and 330 feet east NW cor. SW, Section 14-21-15; No. 10 J. K. Herold in the same section is drilling shale at 3,784 feet; No. 10 Mabry, Section 15-21-15, cemented 6¼-inch casing at 3,830 feet. The company has gone back to No. 13-B Noel, Section 14-21-15, completed some time ago and is drilling deeper at 3,815 feet; No. 19 D. H. Raines, Section 15-21-15, set 4½-inch casing with packer at around 4,000 feet and is bailing to test at 4,025 feet.

Greenwood District—Ferguson and others began drilling No. 1 Abney, a new location 1,486 feet south and 400 feet east NW cor. Section 7-17-16, November 24, set 10-inch casing at 60 feet and cemented 6-inch at 927 feet. Greenwood Production Co. has made location for No. 1 Alexander 1,980 feet north and 1,320 feet west SE cor. Section 27-18-16, and has derrick up. Magnolia Petroleum Co. is drilling lime at 2,339 feet in No. 1 John Furrh, Section 32-18-16. Waterman Brick & Tile Co.'s No. 1 Waterman, Section 18-17-16, began drilling November 26, set 60 feet of 10-inch surface casing and is drilling at 710 feet.

Mooringsport, Vivian, Oil City and Hosston Districts—Bee Oil Co. has derrick up on location for No. 1 Muslow, 200 feet south and west NE cor. Section 29-20-15. W. D. Chew began drilling No. 7 Fee, Section 33-21-16, November 23, set surface string at 100 feet and 6-inch at 1,800 feet. Simplex Oil Co. No. 1 Hunsicker, Section 15-20-15, began drilling November 23, set 10-inch casing at 60 feet and is drilling at 1,250 feet. Standish Oil Co.'s No. 1 Jolly, Section 22-22-15, is coring at 1,048 feet. Standard Oil Co. has made location for No. 190 Stiles, 200 feet north and west SE cor. NE SW, Section 27-21-16, and has rig up ready to drill.

DeSoto Parish

American Controlled Oil Co.'s No. 2 Lanier, Section 5-11-11, is drilling at 2,585 feet.

LaSalle Parish

Elbert Petroleum Co.'s No. 3 Urania, Section 7-10-12e, is shut down at 700 feet. It began drilling November 23 and set 10-inch casing at 100 feet. Zoder and others' No. 6 Urania, Section 7-10-2e, is waiting on standard rig at 1,516 feet.

Monroe District

Morehouse Parish—Consolidated Carbon Co. has begun drilling second hole on No. 1 Perry, Section 14-20-14, the first one 200 feet south of second No. 1 being lost on account of an artesian flow at 370 feet. Natural Gas Products Co.'s No. 10 Tensas Delta, Section 27-22-4e, has cemented 6-inch casing, corrected depth 2,165 feet. The Texas Company has made location for No. 1 Myers, 1,070 feet west and 300 feet north of the center of Section 15-22-7e.

Ouachita Parish—Imperial Oil & Gas Products Co. began drilling No. 3 Stubbs, Section 13-19-3e, November 24 and has set 12-inch casing at 188 feet. Jordan Drilling Co. has cemented 6-inch casing at 2,200 feet on No. 1 Miller, Section 18-18-5e. Ouachita Natural Gas Co.'s No. 2-A D'Arbonne, Section 34-19-3e, has 6-inch casing cemented at 2,167 feet. Southern Carbon Co.'s No. 8 Fairbanks, Section 38-19-4e, is drilling at 1,910 feet. United Carbon Co. has rig up for No. 2 Nelson Fee, Section 6-19-5e. West Virginia Oil & Gas Co. has set 189 feet of 12-inch surface casing in No. 5 Fee, Section 5-18-4e, and is drilling at 600 feet.

Union Parish—Barbour Oil Co. has taken over C. E. Cammatte's No. 1 Tugwell, Section 21-22-1e, and surrounding acreage and is fishing for drill stem, total depth (corrected) 2,060 feet. The well has been standing shut down since June 29. Carter & Goodwin have cemented 6-inch casing at 2,254 feet in No. 1 Security Trust, Section 7-23-1e.

Richland Parish

Gulf Refining Co.'s No. 1 Millsaps, Section 8-17-6e, is drilling at 1,348 feet. Moody & Seagraves' No. 1-B Hemler, Section 20-16-6e, is drilling at 2,285 feet; No. 2-B Hemler, Section 6-15-6e, is drilling at 1,360 feet; No. 1 McClanahan, Section 36-16-5e, cemented 6-inch casing at 2,296 feet, and they are arranging to kill a blow out estimated at 12,000,000 feet of gas at 2,406 feet in No. 2 McCoy, Section 30-16-6e, and set liner. No. 1 Noble, Section 36-16-5e, is drilling shale at 1,825 feet. No. 1 Osborn, Section 14-15-5e, cemented 10-inch surface casing at 985 feet.

Natural Gas & Fuel Corp. is drilling shale at 2,100 feet in No. 1-A Sartor, Section 9-16-6e; No. 2-B Sartor, Section 19-16-6e, cemented 6⅝-inch casing at 2,279 feet. Roxana Petroleum Corp. cored shale at 2,421 feet in No. 1 Tensas Delta Land Co., Section 1-14-5e and is still in it at 2,492 feet. Southern Carbon Co. is drilling sand rock at 1,090 feet in No. 1 Sartor, Section 20-18-8e and has made location for No. 2 Sartor 660 feet south and 660 east of NW cor. Section 26-16-6e. Standard Drilling Co.'s No. 1 Delta Hardwood Co., Section 22-16-7e, is in gumbo at 2,970 feet. Stovall Drilling Co. cemented 6-inch casing at 886 feet in No. 1 Dunning, Section 26-16-6e.

Sabine Parish

Arkansas Fuel Oil Co. has cemented 6⅝-inch casing in No. 11 Logan, Section 33-10-12, at 3-189 feet. Magnolia Petroleum Co.'s No. 2 Rembert, Section 32-10-12, is drilling at 3,182 feet. Moffat and others' No. 3 Moore, Section 5-9-12, would not flow through tubing and is waiting on standard rig, total depth 3,332 feet. Seip and others have rig up on No. 1 Moore, Section 33-10-12.

Webster Parish

Cotton Valley—Humble Oil & Refining Co. is drilling shale at 1,975 feet in No. 5 J. Babb, Section 14-21-10, and is in lime at 3,490 feet in No. 1 Gray, a Trinity test in Section 26-21-10. Magnolia Petroleum Co. has rig up to drill No. 1 J. M. Nixon, Section 22-21-10, and Ohio Oil Co. has made location for No. 1 Crichton 660 feet south and 330 feet west NE cor. E half NE SE, Section 21-21-10. Ohio is drilling lime at 4,479 feet in No. 4 Holloway, Section 23-21-10.

Sarepta, Spring Hill and Shongaloo Districts—Arkansas Natural Gas Co. has rig up to drill No. 1 North Central Texas, Section 36-23-10. Magnolia Petroleum Co. cemented 6⅝-inch casing at 2,577 feet in No. 1 Haynesville Mercantile Co. Section 1-22-10, and is drilling out plug; No. 1 Munn is a new location in the center of NW SW, Section 29-23-9. No. 1 Newsom, Section 32-23-9, has 6⅝-inch casing cemented at 2,587 feet and rig is up on No. 1 Roseberry, Section 29-23-9. Northwest Louisiana Gas Co. No. 1 Munn, Section 29-23-9, began drilling November 25, set 400 feet of 10-inch surface casing and is drilling at 1,200 feet.

ARKANSAS

Nevada County

Five wells in the Irma district are shut down on top of the sand or in the pay waiting on standard rig as follows: Humble Oil & Refining Co. No. 4-B

Tycos Air Operated Pressure Regulator

No. 16100

Constant pressure in steam boilers, gasoline plants, "cracking" units, etc. is assured by the Tycos Singl-Duty Pressure Regulator, which is recognized as one of the most practical, efficient, and successful instruments on the market for pressure regulation.

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Groves, Section 1-14-21, at 1,140 feet with the bottom 4 feet in the sand; J. J. O'Brien's No. 2 Robert Haynie, Section 6-14-20, in 3 feet of sand 1,201-4 feet; J. J. O'Brien's No. 1-B William Haynie, Section 6-14-20, in 20 feet of sand 1,198-1,218 feet; J. J. O'Brien, No. 15-A Moss, Section 1-14-21, 6 feet of sand 1,164-70 feet; Wright Oil Co. No. 3 Groves, Section 12-14-20, 3 feet of sand 1,148-51 feet.

Ouachita County

Smackover—Humble Oil & Refining Co. No. 4 Murphy, Section 3-16-15, drilling at 2,429 feet. Marine Oil Co. tested salt water at 2,667 feet in deepening No. 8 Hays, Section 4-16-15, an old completion at 2,622 feet, and has plugged back to 2,200 feet for a test of the Meakin sand. Phillips Petroleum Co. re-cemented casing at 2,629 feet in No. 19 Joyce, Section 33-15-15, also an old well being worked over and deepened. Standard Oil Co.'s No. 5 Umstead, a workover in Section 32-15-15, is drilling lime at 2,312 feet.

Union County

Champagnolle District — Garrett Modisette Drilling Co.'s No. 1 Gregory, Section 10-17-14, is standing full of fluid 75 per cent salt water from 2 feet of sand 2,763-65 feet, and is arranging to run 3-inch tubing in an effort to make it flow. If it doesn't, it will be standardized. Eddie Jones has rig up to drill No. 2 Crain, Section 2-17-14; No. 3 is a derrick in the NW cor. NE SE of the same section and No. 4 Crain is a location in the NE cor. NE SE of the same section. Ohio Oil Co. had a show of oil and gas in No. 3 Crain, Section 1-17-14, in 2 feet of sand 2,988-90 and is arranging to cement 6⅝-inch casing for a test; No. 5, same lease and section, is drilling at 2,520 feet; No. 6 is rigged up ready to drill. No. 1 H. R. F. Goode is a new location in the SE cor. NW SE, Section 2-17-14 offsetting Eddie Jones' No. 1 Crain. No. 1 R. Pumphrey, Section 1-17-14, set 10-inch surface casing at 313 feet and is drilling at 1,715 feet; No. 2 is a new location in the NW cor. SE SE, Section 2-17-14 rigged up ready to drill; No. 3 is a derrick in the NE cor. SW SE, in the same section and No. 1 Pumphrey, Section 1-17-14, tested 250,000 feet of gas in 4 feet of sand 2,990-94 feet, and cemented 6⅝-inch casing at 2,986 feet for a test. Rovenger Oil Corp. cored the top of the Moody sand from which completions in the district so far are producing at 3,052 feet in No. 1 McCain, Section 4-17-14, went in to swab, lost the swab and now has a fishing job.

Smackover District—Magnolia Petroleum Co. cemented back from 2,690 feet to 2,440 feet in No. 8 Murphy, Section 8-16-15, formerly completed as a 10,000,000-foot gasser at the deeper level; they are coring No. 7 Wilson, Section 17-16-15, at 2,378 feet following a salt water test that filled up the hole 800 feet.

El Dorado and Lisbon—Grimes Brothers have derrick up for No. 9 Van Hook, a new location in the SE cor. SE NE, Section 7-18-14, El Dorado East Side Pool, and their No. 1 Williams, Section 8-18-14, is waiting on standard rig with 1,800 feet of fluid, 20 per cent water, standing in the hole from 10 feet of sand, 2,229-39 feet. Rice and others' No. 1 Newton, Section 13-17-16, which has been shut down at 3,003 feet for the last month, was drilled to 3,126 feet and is again shut down; waiting for funds.

EAST TEXAS

Harrison County

J. R. Bahan's No. 3 Hickman, E. Pollock Survey, tested 3,000,000 feet of gas at 2,950 feet and plugged back to 900 feet to perforate casing for a test in the shallow sand. Doney and others' No. 1 Furrh, Joel Lipscomb Survey, has 6-inch casing cemented at 986 feet. Magnolia Petroleum Co. No. 1 Will Anderson, Jacob Womack Survey, is waiting on standard rig at 2,402 feet. Mitchell and others' No. 1 Jones, 2,833 feet east and 2,157 feet north SW cor. Joel Lipscomb Survey, is drilling plug at 940 feet. State Line Oil & Gas Co. cemented 6-inch casing at 955 feet in No. 2 Mullins, T. D. Wilson Survey; No. 5 C. M. Abney estate, E. Little Survey, is drilling at 2,797 feet.

Panola County

Bethany Oil & Gas Co. has began drilling No. 3 Burns, W. A. Birdsong Survey. Magnolia Petroleum Co. No. 1 Lila Fletcher, B. C. Jordan Survey, is coring at 2,262 feet; No. 2 Jehu Jernigan, Jane Thorpe Survey, began drilling November 26, and is down 200 feet; No. 2 Sol Oden, E. F. Mitchell Survey, is rigging up to drill and No. 1 J. M. Trosper, James Shadoin Survey, is drilling hard shale and lime at 2,276 feet.

SOUTHWEST WILDCATS

(Continued from Page 56)

1 Robuck is in the Ben McCulloch Survey and is moving in machinery. Alexander-Lyles and Fred Adams are starting in the No. 1 Ballard in the William Spillers Survey. Two new wildcats are starting in the northern part of the county, one by John Storey who discovered the Lytton Springs Field with Frank Lefevre. His test is 5 miles northeast of Lockhart. The other test is 3 miles north of Lockhart. It is a territory that has looked good to others and previous wildcats by process of elimination of dry territory have helped to narrow the field down and enhance the chance of getting production.

Brooks County

The Texas Company's No. 3 Lasater, Survey 329, located 2,380 feet to north line and 450 feet to west line, is drilling at 4,571 feet in hard sand.

Duval County

Driscoll and others' No. 5 Driscoll, Survey 23, located 1,000 feet to south and 550 feet to west lines, is working on test at 2,469 feet trying to save hole. National Oil Co.'s No. 1 Ball, Survey 15, located 450 feet to north and 150 feet to east lines, is drilling.

Hidalgo County

Queen City Oil & Gas Co.'s No. 1 Adams, Lot 1, Block 82, 3 miles north of Mercedes, is fishing at 2,155 feet. D. L. Smith Oil Co.'s No. 5 Fernandez, Porcion 46, Block 34, is shut down at 1,700 feet.

Jim Hogg County

Paesano Oil Syndicate's No. 1 Campbell, Las Vivoritas grant, is standing at 2,410 feet. O. W. Killam's No. 1 Canales, Valuarto grant, is drilling at 2,700 feet. T. G. Shaw's No. 1 Jones, Survey 381, Block 22, located 171 feet to south line and 486 feet to west line, is standing at 40 feet. Holden and others' No. 3 Jones, Block 136, Section 27, is standing at 2,548 feet.

Starr County

Clark & Woodruff's No. 1 Kelsey, Porcion 76, is drilling at 305 feet. J. E. Harston's No. 1 H. Guerra, Survey 43, located 660 feet to south line and 1,320 feet to east line, is drilling at 400 feet. T. W. Foltz and others' No. 1, Survey 301, located 150 feet to northwest and 2,400 feet to west line, is rigged up.

Atascosa County

Lumberman Oil Co.'s No. 1 Shaw, Block 331, north central, is drilling at 80 feet.

Bastrop County

Noack & Laning's No. 1 E. Roemer, Isaac Casner league, 150 feet to northeast corner, is drilling at 1,050 feet.

Caldwell County

Pat M. Armstrong's No. 1 Hardeman, Miles G. Dykes Survey, 150 feet to northwest and southwest lines of farm, is rigging up. Ratcliffe's No. 1 New, James Hindes Survey, 150 feet to west and 600 feet to south line, is shut down at 2,914 feet in Edwards.

Dimmitt County

Humble Oil & Refining Co.'s No. 1 City National Bank, Survey 654, located 700 feet to north line and 2,000 feet to east line, is drilling at 4,387 feet.

Goliad County

C. W. Simpson's No. 1 Ideus, W. H. Pendleton Survey, 156 feet to north line and 540 feet to west line of lease, is making test at 2,107 feet.

Frio County

Karnes and others' are making location for test 14 miles southwest of Moore. Lain & Brown's No. 1 Edwards, Hooper & Wade Survey, 920 feet to center north

line, at 1,051 to 1,250 feet is alternating in hard rock and gumbo and shut down for rock bit. P. A. Neilan's No. 2 Blackaller, James Gouley Survey, is drilling at 2,820 feet in Eagle Ford.

Gonzales County

Gonza Petroleum Co.'s No. 1 Sinclair, 4 miles northeast of No. 2 Elder, has resumed drilling at 1,200 feet, at which depth it has been standing for some time. L. L. Jones and others' No. 1 Campbell, Moore & Bridges Survey, at 1,733 feet has completed fishing job and is preparing to test gas showing. L. P. Unkel's No. 3 Johnson, C. H. Jaeger Survey, at 912 feet (corrected depth), plans to drill deeper.

Guadalupe County

F. A. Lain's No. 1 Weinert, W. K. Estell Survey, 150 feet to center north line, has completed water well and is rigging up to resume drilling in the oil well at 3,004 feet. Eugene Sights' No. 1 Kruger, Isaac Baker Survey, 450 feet to north and west lines, is shut down at 2,180 feet.

Hays County

J. E. Rodgers' No. 1 Hohenburg, 2½ miles east of San Marcos, is fishing at 2,093 feet with small oil showing.

Kerr County

Walker-Van Duyn's No. 1 Barfield, B. B. Peck Survey, 4,700 feet to north and 450 feet to east line, is drilling in shale at 1,000 feet.

Kinney County

Havelin Oil Co.'s No. 1 Weatherby, Section 26, Block 1, shot with 300 quarts at 4,064-4,374 feet, tools stuck at 3,600 feet. Stephens and others' No. 1 Jim Clamp, Survey 346, is standing at 1,070 feet.

LaSalle County

Sun Oil Co.'s No. 1 Washburn, Survey 157, located 3,500 feet to north line and 3,400 feet to west line, is drilling in Cook Mountain at 2,050 feet, elevation 413.2 feet.

Live Oak County

Simmons Oil Co.'s No. 3 Reagan is fishing; No. 1 McGriff at 256 feet had gas blowout and is estimated as a commercial well; No. 2 McGriff is drilling; No. 2 Reagan is location; No. 4 Sartain is shut down at 2,303 feet to change to heavier rig. Houston Oil Co.'s No. 21 Cartwright, J. M. Colchado Survey, has set casing at 1,616 feet.

Medina County

Pat M. Armstrong's No. 1 Mangold, Survey 62, located 200 feet to south and east lines of farm, is drilling at 360 feet. F. Banderet's No. 1 Mofield, Survey 532, at 550 varas to east line and 950 varas to north line of survey, is drilling. Chacon Oil Co.'s No. 1 Jungman, Survey 31, at 950 feet to west and 600 feet to south line, is drilling at 500 feet; No. 2 Jungman is drilling at 100 feet.

Maverick County

Ryan Consolidated Petroleum Co.'s No. 1 Indio, Survey 14, is drilling at 2,880 feet. Rycade Oil Corp.'s No. 1 Chittim, Section 129, Block 7, is fishing at 4,295 feet; No. 2 Chittim, Section 158, Block 7, is drilling at 2,504 feet; No. 2 Sullivan is changing to rotary rig at 5,132 feet.

San Patricio County

Ed R. Herwick's No. 1 Tsesmelis is drilling. National Oil Co.'s No. 1 Sullivan, J. C. McMullen Survey, 500 feet to southwest corner, has resumed drilling at 1,138 feet. George B. Pickett's No. 1 Garrett is standing at 3,030 feet; No. 1 Whitworth, Section 60, is drilling at 244 feet. John Sigmund's No. 9 Robinson is preparing to drill in at 1,600 feet.

Travis County

Roy Clark and others' No. 1 Carl Jacobson, C. Harrison Survey, 500 feet to east line of farm, is drilling at 450 feet. T. P. Garrett's No. 1 Roew, R. Hornsby Survey, 900 feet to north and east lines and 8 miles east of Austin, between 500 and 600 feet had oil showing on slush pit.

Uvalde County

Pure Oil Co.'s No. 1 J. D. Smythe, Survey 687, located 740 feet to north and 146 feet to east of southeast corner of Survey 20, is drilling.

Victoria County

J. J. Elam's No. 1 Vol Kutchka, 200 feet to CNL of Section 40, is rigging up. Humble Oil & Refining Co.'s No. 1 Welder, southwest corner of ranch, is drilling in rock at 214 feet. R. M. Talbott's No. 1 Reeves estate is shut down at 1,825 feet.

Val Verde County

East Del Rio Oil Co.'s No. 1 Russell, Section 183, is shut down in hard brown lime at 3,210 feet. Independent Operator's No. 1 Whitehead, SE SE Section 30, Block 4, is shut down at 3,925 feet. Magnolia Petroleum Co.'s No. 1 Whitehead, Survey 81, is drilling in hard sandy lime at 5,170 feet. O. O. Owens and others' No. 1 Mills, Section 128, Block 1, is in gray sandy lime at 3,270 feet and has about 1,500,000 feet of gas. W. V. Traves' No. 1 Wilson, Section 115, is rigging up.

GULF COAST FIELDS

(Continued from Page 51)

fee is drilling below 4,335 feet. Moody Corp.'s No. 2 Hume is washing at 4,425 feet. Navarro Oil Co. has not started drilling yet in its No. 4-B Cain. Its operations the past week have been centered in installing a treating plant to handle the output of its No. 2 Cain, which was completed several weeks ago as the deepest producer in that field. Rio Bravo Oil Co. is drilling around 4,300 feet in No. 1 P. S. A. No. 7 P. S. A. is down below 3,720 feet. No. 1 G. H. & S. A. is down 2,960 feet, and No. 101 on the same lease 3,760 feet. T. G. Shaw and associates' No. 1 Fitzsimmons is drilling below 3,000 feet. Sun Oil Co.'s No. 1 is down 4,425 feet where strainer is being set for a test.

At Hockley, Humble Oil & Refining Co. is drilling gumbo at 2,565 feet.

Jefferson County

Yount Lee Oil Co. and the Sun Oil Co. completed two good wells each at Spindletop during the week. The former company's No. 46 Gladys City is flowing 3,000 bbls. daily from sand at 3,170 feet and its No. 47 is making 1,500 bbls. from sand at 2,762 feet. Sun's two wells Nos. 16 and 17 McLean, are making a total of 5,456 bbls., the former at 5,075 feet and the latter at 4,985 feet. J. O. Davis has abandoned No. 2 Gladys City after drilling to approximately 5,900 feet.

Gulf Production Co.'s No. 10-A Marrs McLean at Spindletop is drilling around 4,900 feet. No. 9 Daisy Roche is down 3,975 feet, and No. 12-A Weed, an old well starting to drill deeper, is down 5,025 feet. No. 6 Jack & Duff is drilling around 4,760 feet. Magnolia Petroleum Co.'s No. 7-A Fee is down below 4,750 feet. Rio Bravo Oil Co.'s No. 2 T. & N. O. is drilling around 2,940 feet. Sun Oil Co. is making preparations to deepen No. 1 McLean. Its No. 6 McLean is drilling around 5,690 feet.

Liberty County

Empire Gas & Fuel Co. has completed No. 27 Barngrover, Hull Field, pumping 125 bbls. daily from sand around 3,140 feet. Gulf Production Co. also got a well at Hull pumping 70 bbls. with a showing of water at 2,623 feet. This is the No. 1 Phoenix. Gulf's No. 87 Phoenix is drilling around 4,200 feet and its No. 11 Thomas at 3,300 feet. Hull Oil Co.'s No. 7 Harrison the latter part of the week was being bailed, it having a sand around 3,010 feet. Navarro Oil Co.'s No. 3 Harrison is being worked over. Republic Production Co. is to be deepened after showing dry at 2,685 feet. This company also is making arrangements to deepen its No. 23 Dolbear. No 89 on this lease is drilling around 4,030 feet. The Texas Company also is to deepen another of its old wells, the No. 2 Hannah fee. No. 7 Hannah, which is being drilled co-operatively by The Texas Company and the Vacuum Oil Co. is in gumbo and boulders at 1,340 feet.

At North Dayton, Deering & Kayser encountered a sand at 2,650 feet in No. 1 Pruett and at the end of the week was preparing for a test. Harrison Oil Co. is sidetracking at 2,085 feet in No. 2 Jones, an old well to be deepened. Humble Oil & Refining Co.'s No. 5 Welder, South Dayton, still is fishing liner.

Montgomery County

Johnson & Hardy have abandoned their No. 1 Hardy, four miles south of Conroe after striking an artesian water flow at 1,104 feet but already have a

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location for No. 2 Hardy, 50 feet north.

Orange County

Brownie-Babbette Oil Co. has started deepening No. 3 McLean and now is below 3,910 feet. Gulf Production Co.'s No. 1 Hager & Moore, another old well starting to drill deeper, is down below 3,325 feet. No. 2 Lee Hager fee was being rigged up for bailing as the week closed. It is down approximately 4,000 feet. Gulf Coast Oil Co.'s No. 5 Leon has encountered an oil sand at 3,325 feet and is to be put on the pump. Humble Oil & Refining Co. still is fishing and cleaning out hole in No. 1 Kishi-Lang. This well formerly was completed at 3,139 feet and is to be deepened. Humble Oil & Refining Co. is setting screen in No. 5 Meyers. Rycade Oil Corp.'s No. 13-E State is drilling around 3,760 feet. Sinclair Oil & Gas Co.'s No. 4 Granger was dry at 3,325 feet. Sun Oil Co.'s No. 2 Brown is down around 3,910 feet.

Washington County

C. A. DeWare has abandoned No. 1 Lehman in the Brenham district. This test was drilled to a total depth of 2,708 feet and was in a formation of shale and boulder. It encountered a showing of gas at 867 feet. Locations for two new tests have been made in this county, one at Brenham by Miller and associates for No. 1 Pennington, and the other near Somerville by the Sun Oil Co. for No. 3 Freeman. Pratt and associates also are getting ready to start drilling No. 2 Brinkmeyer at Brenham.

Walker County

Thompson and associates' No. 1 Thompson Lumber Co. has been abandoned after drilling to 2,511 feet.

Wharton County

Texas Gulf Sulphur Co. has abandoned eight tests in the shallow Boling Field. These tests, however, were drilled primarily for sulphur exploration. They were as follows: No. 1 Sitta, No. 1 Senf, No. 1 Kostelink, No. 1 McCarson heirs, No. 5 Banker, No. 4 Bay, No. 2 Chase and No. 1 Pachy. This company made locations during the week for six other shallow tests. These also are sulphur tests and concern the oil operators only in the possibility of geological revelations and possible oil showings.

Gulf Production Co. also has a location for a shallow test at Boling, the No. 3 Abendroth as has the Hyde Production Co. for No. 5 Woytek. These are new locations not previously reported. Gayle & Patterson abandoned their shallow test, the No. 3 Bay after hitting salt water at 466 feet. Ingram Prospecting Co. is drilling around 425 feet in No. 1 Hounshell.

Weller County

J. R. Garrett and associates' No. 1 Garrett, 12 miles south of Hempstead, is drilling around 950 feet.

SOUTH LOUISIANA

Acadia Parish

Cline and associates' No. 6 Conklin is drilling around 2,175 feet. Evangeline Oil Co.'s No. 1 Cline is down below 1,875 feet. Port City Oil Co.'s No. 8 Jennings-Heywood is drilling gumbo below 1,513 feet, while No. 8 S. F. S. is down 1,750 feet. This company's No. 2 S. F. S. has been abandoned at 1,650 feet. Salt Dome Oil Co.'s No. 1 Valle is drilling around 1,575 feet, and The Texas Company's No. 106 Latriell around 1,625 feet. The Texas Company's No. 2 Rayne heirs is down below 3,575 feet. All the above tests are in the Evangeline Field.

Calcasieu Parish

At Lockport, Vacuum Oil Co. and Gulf Refining Co.'s No. 19 Miller is down 1,267 feet where 13⅜-inch casing has been cemented. No. 3 Farquahar is down 4,400 feet where preparations are being made for washing. The 6⅝-inch casing string is being set at 3,832 feet in No. 3-A on the same lease, while at No. 5 a fishing job is under way. The latter test is at a total depth of 5,667 feet. No. 4 Bayou D'Inde State is drilling gumbo around 3,958 feet. The 6⅝-inch casing was set at 3,848 feet. No. 2 Frieber & Wolf is coring, a hard sand was cored at 5,816-21 feet.

At Vinton, the Vinton Petroleum Co.'s No. 9 Gordon is drilling below 2,700 feet. This company's Gray test is drilling around 2,515 feet.

At Edgerly, Davis & Walker's No. 1 Lyons is standing after testing salt water at 3,739 feet. Drysdale-Savoy Oil Co.'s No. 2 Hill is drilling gumbo around 2,820 feet. Hercules Oil Co.'s No. 1 Paraffine is drilling around 3,580 feet. West Edgerly Oil Co.'s No. 1 Krouse & Managam is drilling gumbo around 4,425 feet.

Gulf Refining Co. has a location for another test on the Starkes Dome in the western part of the parish. This will be the ninth test on the Industrial Lumber Co.'s land. No. 8 was abandoned 10 days ago. No. 7 Lutcher-Moore, on the northern flank of the dome is drilling in gumbo and lime at 4,959 feet. The Industrial tests are on the southern flank.

Newton Drilling Co. is reported to have some oil in its No. 1 Dupre from sand at 2,496-2,508 feet. As the week closed definite reports of the find had not been learned at Houston.

Cameron Parish

Locations for two new tests have been made at Hackberry, one by Calcasieu Oil Co. for No. 1 Gulf Land Co. and the other by C. O. Noble and associates for No. 1 Ellender. These make the second and third locations for tests since Calcasieu Oil Co. brought in its No. 2 Caldwell, November 5, flowing 1,000 bbls.

Evangeline Parish

Tom Hincey and associates' No. 1 Dicide Guillery, at Pine Prairie has been shut down and at present is awaiting orders.

Iberia Parish

Gulf Refining Co.'s No. 3-Z State, Faussa Point, at last reports was drilling rock at 1,175 feet. This company's No. 1 Broussard was in gumbo at 3,820 feet after sidetracking.

Ascension Parish

Roxana Petroleum Co.'s No. 1 Wilbert, White Castle, is drilling shale and gravel at 1,050 feet.

Iberville Parish

Union Sulphur Co. is digging canals and getting rigged up to start two tests, the No. 1 Wilbert on the Bayou Des Glais Dome and the No. 1 Schwing on the Bayou Blue Dome.

Miscellaneous

Gulf Refining Co. was drilling hard lime rock at 1,320 feet in No. 1 Sibert-Stark, LaFourche Parish. Rycade Oil Corp. has a derrick up for No. 2 Atchafalaya fee, St. Martin's Parish. Louisiana Exploration Co.'s No. 1 Blanche, St. Mary's Parish, has been shut down at 2,702 feet. Terre Bonne Gas Co.'s No. 1 Gaidry, Terre Bonne Parish, also has been shut down below 2,570 feet. Southern Gas Co. is cleaning out the hole at No. 3 South Down.

CALIFORNIA FIELDS

(Continued from Page 53)

Huntington Beach during the past seven-day period, neither of which, however, showed substantial production. Deck & Campbell put No. 1 Huntington on a pumping test in the shallow zone at 2,121 feet and it showed an initial of 75 bbls. of heavy 14.1 gravity oil daily. The H. & P. Oil Co.'s No. 1 Huntington started off pumping 150 bbls. daily from 3,945 feet, the hole having been finished with a 6¼-inch oil string carrying 218 feet of perforated. The Barnsdall, following its recent successful completion of Nos. 7 and 14 on the O'Dea lease at Rosecrans is moving rotary equipment into No. 9 O'Dea and will add another 700 feet of hole in order to carry this well down to the deep sand where good production can be anticipated. The Union recently spudded in No. 4 Padelford in this field and while the company is also running two strings of tools on the Howard Park property no change is anticipated in the company's present policy of refraining from drilling until conditions improve. The Chanslor-Canfield Midway Oil Co. finished another new well over in the Torrance Field a few days ago when No. 95 Torrance was put on the beam at 3,381 feet. It showed an initial pumping of 50 bbls. of 17.1 gravity oil daily.

Ventura

The Associated's No. 4 McGonigle fin-

ished in the Ventura Avenue Field during the early part of the week is still holding up in good shape and there is no evidence at the present time to indicate that anything more than a normal decline can be expected. This well was drilled down to 6,207 feet, from which point it came in flowing 3,095 bbls. of clean 30.2 gravity oil and 3,500,000 feet of wet gas daily. The Associated has five additional wells in this field nearing completion and two or three of them should be tanking oil before the new year rolls around. The Shell and Petroleum Securities should also add a new well or two within the next 30 days and they should be followed by several more early in 1928. The Bolsa Chica will probably bring in No. 3 Hartman within the next 30 days unless something unforeseen develops, as the bit in this hole is at present rotating ahead at 6,265 feet with the 6,500-foot level as the objective.

Kern River

Operators in the Kern River Field have just closed a rather busy week during which time five new producers were chalked up. The Associated finished the largest well added during the week, as its No. 45 in Section 23-28-27 showed an initial of 192 bbls. daily from the 2,299-foot level. The Chanslor-Canfield Midway Oil Co. finished No. 7 in Section 23-28-27 as a 145-bbl. pumper from 2,309 feet during the early part of the week and this well was followed into production a few days later by No. 10, which showed an initial pumping of 140 bbls. from 2,286 feet. Both were finished with 8⅝-inch oil strings carrying a little better than 300 feet of perforated. The Standard's No. 17 in Section 15-28-27 is listed as a 145-bbl. pumper from 2,355 feet, the hole having finished with an 8⅝-inch oil string carrying 250 feet of perforated. The Wonder Oil Co. put its No. 3 in Section 23-28-27 on a pumping test at 2,086 feet, and it tanked 164 bbls. of 14.8 gravity oil during the initial 24 hours. A check of the various operations under way along the Kern front indicate the probable completion of three or four additional wells during the coming week. The General Petroleum, St. Helens, Petroleum Securities and Standard should each add one new well within the next 10 days. George F. Getty, who has just about concluded lease obligations on the Tegeler and Lehnhardt leases, spudded in Nos. 1 and 8 on the McDougal property in Section 26-28-27 late last week and both should be finished within the next 21 days. The Pan American and Midland Oilfields Co., a subsidiary of the California Petroleum Corp., will probably start active development work soon on the government leases which each acquired a few weeks ago. The acreage in question is in proven territory and if these concerns push development work ahead as fast as anticipated they may increase the daily production of the Kern River Field about 3,000 bbls. within a relatively short time.

Goleta

Drilling operations in the Goleta Field, about 14 miles west of the town of Santa Barbara, have been practically at a standstill since the terrific decline which occurred in field production a few months ago. These wells flattened out almost over night and gave the Miley Exploration Co. a rather unpleasant surprise, as they had previously shown rather prolific tendencies. The oil produced at Goleta is of an exceptionally high grade, testing around 42 degrees A.P.I. and showing a gasoline content of approximately 60 per cent. Daily production on the Tecolote property is averaging about 10 bbls. per well and while this is commercially productive because of the shallow depth required for completion and the superior grade of oil secured, drilling operations have been reduced to an absolute minimum and no change is anticipated until conditions within the industry improve. The Santa Barbara Oil Co.'s wells have not shown as severe a decline as those on the Tecolote property, although they are not holding up to their initial flush by any means.

With the Goleta Field removed from consideration as a possible important factor in state production, the future recovery of this district may be substantially increased by the Barnsdall's development of production on the Edwards anticline approximately 2 miles west of the original discovery on the Tecolote property at Goleta. The Barnsdall incidentally holds 1,358 acres on the Edwards & Doty properties west of the present Goleta Field. No. 1 Edwards, the company's first test in this section, has a potentiality of around 200 bbls. of 41 gravity paraffin base oil from the 2,481-foot level. Geologically, the Edwards anticline is a little less than a mile wide and approximately 2 miles long. It is believed to be a continuation of the Goleta anticline, although it is a separate structure in as much as there is a definite break between the two areas. The Edwards anticline has the unique distinction of containing both an asphalt and a paraffin base crude. The former, a black oil, comes from the Modello, or Monterey shales, while the paraffin product is produced from the Sespe formation.

Northern California Wildcats

There are several rather promising wildcat areas under development in northern California at the present time and the critical stage should be reached in most cases within the next 30 days. The Pacific Eastern is deepening its wildcat in the Union Avenue area at Bakersfield in Kern County and while the upper zone has been eliminated as far as the present test is concerned it should by no means be deduced that it has no possibilities as any horizon which can shoot a 4-inch intermittent stream of oil half way up to the crown block will bear watching when given a test under ideal or even favorable conditions. The gas zone which overlies the possible oil horizon at Union Avenue has prevented the Pacific Eastern from concluding a satisfactory test in its initial wildcat and the company contemplates the drilling of a second hole in the immediate area for the specific purpose of giving this sand a chance to do its stuff. A new location has been tentatively selected in the SW, Section 5-30-28, and while the well will probably not get under way until drilling operations are concluded on the present wildcat in Section 6, it is believed that actual spud will be made early in the new year. J. E. O'Donnell has concluded satisfactory lease arrangements in Section 7-30-28, and he plans to drill a test approximately a half mile southeast of the Pacific Eastern's original wildcat in Section 6 and this hole will bear watching for O'Donnell puts them down in fast time and will get the grease if it is there.

The Edison district southeast of Union Avenue looks like an exceptionally good shot and the showings found by the General Petroleum which will result in an early test have focused the attention of operators on the possibilities presented by this territory. The General Petroleum is not entertaining any false hopes although the company has every reason to believe that it may be sitting on top of another oil field. There is some question as to whether the present showings are of sufficient thickness to result in commercial production since they were more like a series of thin sands than a solid zone but this will be definitely determined tomorrow or next day as steps are under way to make a preliminary production test. At any rate this area warrants further work irrespective of the production test to be made by the General Petroleum. The Midway Northern has a rig going up for No. 1 Brown, a new well located in this district, and actual spud will be made in the very near future. George F. Getty's Edison wildcat in Section 5-30-29 is being listed for abandonment as a dry hole at 3,717 feet and with the last formation being reported as a hard gray sand some are inclined to believe that it is really not deep enough to prove a real conclusive test, notwithstanding the fact that no showings of importance were logged from the grass roots down.

The third promising wildcat area under development in northern California at the present time is located just north of the Union Avenue district and this theoretical interval is being tested out by the Pacific Eastern, the same concern

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which brought the Union Avenue area into the spotlight several months ago. These three areas, Edison, Union Avenue and Fruitvale, are located on the so-called Bear Mountain sheer zone and the possible productive acreage was blocked out in each area by a combination geological projection method which is nothing more than plotting various sectors from a certain given datum point. The datum point used in this case was the Pacific Eastern's wildcat at Union Avenue. This well showed evidences of resulting in commercial production and with this as a base Hoyte S. Gale located a possible productive interval northwest and another southeast where it was assumed that there might be additional fields if oil was found at Union Avenue. This accounts for the interest being shown and the money expended in wildcatting operations at Fruitvale and Edison, the former northwest and the latter southeast of the Union Avenue section at Bakersfield.

Another rather promising district under development north of the Tehachapi Range is the Mon Bluff sector, approximately 3 miles southeast of the Mount Poso Field, which is located about 15 miles north of Bakersfield. This area is being tested out by the Union, Shell and General Petroleum at the present time and looks rather promising for production. In fact several well-informed geologists are willing to wager on the possibilities. Geologically the area is extremely favorable for the accumulation of oil in commercial quantity and I would suggest that the Union's No. 1 Tribe be watched very closely during the course of work as it appears to be very favorably located. The General Petroleum logged some rather favorable looking streaks of oil sand in its No. 1 Glide in Section 21-27-28, just north of the Union's test and this well also looks exceptionally promising. If either of these three companies develop commercial production it will be on an entirely separate structure from the Mount Poso Field to the north.

Rex B. Goodcell, trustee of the Fort Wayne Syndicate's wildcat in Maderia County, Section 22-10-17, reports several minor showings above the 2,200-foot level just previous to the development of mechanical trouble which left several stands of drill pipe in the hole at 2,250 feet. The Miley Exploration Co. spudded in a new wildcat in San Luis Obispo County, Section 15-29-17, a few days ago and further drilling operations will be watched with interest. The Richfield Oil Co. resumed work on its wildcat near by in Section 10-29-17, and these two wells, located about 50 miles from the nearest production at McKittrick, stand a good chance of opening up a new field. The Richfield recently cored a blue shale showing large quantities of shell quite similar to that found in the Elk Hills Field. The shale found in this core, taken at 2,113 feet, indicated that the Etchegoin formation has been encountered and if this deduction is correct the oil sand should be encountered very soon if it is present in this vicinity. The Miley Exploration Co.'s test is being drilled on a 1,500-acre tract approved by Ralph Arnold. The Richfield has approximately 1,100 acres tied up and this structure, which is quite evident on the surface may yield oil in commercial quantities.

Southern California Wildcats

Wildcatting operations in southern California do not reveal the existence of any outstanding areas expect possibly a limited section in the San Fernando Valley where the Shell Oil Co. is drilling a test at the present time. This wildcat, incidentally, showed a few minor indications a week or so ago and the company has been coring almost solid since that time. There have been a number of wells drilled in the San Fernando Valley during the past 8 or 10 years but in each case the hole has been abandoned as a duster. The Shell's No. 1 Mission should be watched rather closely during the next several weeks, however, as it is one of the few tests drilled in the valley which has really shown any material evidence of the existence of oil. The Monterey Park Oil Co., which has been drilling in a hard conglomerate for several weeks, has picked up a softer formation and from now on better footage should be possible. This hole incidentally has logged several small but encouraging indications of oil and gas from time to time. The Standard is pulling up stakes at Olive and this test is being abandoned as a dry hole at 5,020 feet. The Shell's No. 1 Allec, at Placentia in Orange County has also taken on a rather doubtful outlook and an early abandonment in this case would not be at all surprising. The Associated is making fairly good footage in its Pico wildcat and this hole should reach the critical stage within the next 30 days. This wildcat is located a little less than 2 miles away from a duster drilled by the Standard on the Hadley ranch but the failure of the latter to secure production in no way affects the Associated's chances of success. The Associated is working on the theory that geological conditions in the Rivera area may be analogous to conditions at Seal Beach where the topographical on the Hellman property is only the remains of a topographical feature which had been eroded away in the course of time by the San Gabriel River. The Associated's geological staff believes that there is a possibility that the real high point at Pico may have been eroded away, such as has occurred at Seal Beach, leaving only a small rise as the only evidence of a major topographic high.

KANSAS FIELDS

(Continued from Page 44)

at 2,060 feet. Culp and others' No. 1 Lesseney, SE cor. NE NE, Section 33-27-13, is dry and abandoned at 1,790 feet.

Harper County

Amerada Petroleum Corp. is building the rig for No. 1 Mendeville, C SE NE, Section 24-34-6w.

McPherson County

The Texas Company's No. 1 Chinberg, NW cor. NE NW, Section 32-18-2w, is good for 7,000,000 feet of gas from sand 2,943-67 feet.

Russell County

Mid-West Refining Co.'s No. 21 Austin, NE cor. SW SW, Section 30-12-15w, was completed for 75 bbls. in sand 3,048-63 feet.

Seward County

Wilson & Moore's No. 2 Boles, SE cor. NW, Section 3-35-34w, is drilling at 2,150 feet.

Sumner County

Roxana Petroleum Corp. has the rig up for No. 9 Oxford Townsite, Lot 7, Block 36, Section 11-32-2e. Derby Oil Co. made location for No. 2 Spence, Tract 3, Oxford Townsite, Section 14-32-2w. Shawver & Jarvis made location for No. 2 Scroggins, Midland right of way Oxford Townsite, Section 14-32-2e. Roxana Petroleum Corp.'s rig is up for No. 8 Community, Lot 9, Block 54, Oxford Townsite, Section 14-32-2e. The rig has been erected for No. 1 Rothwell, SE cor. NE SW, Section 14-32-2e. Mead and others built the rig for No. 1 Emerich, Tract 5, Oxford Townsite, Section 14-32-2e. Wasson and others made location for No. 1 Gassoway, NE cor. SE SW, Section 14-32-2e.

Champlin Oil & Refining Co.'s No. 1 Love, NW cor. NE SW, Section 9-30-2w, was completed for 45 bbls. from sand 3,023-49 feet. No. 2 Latta "B", SE cor. SW NW, Section 9-30-2w, gauged 5,000,000 feet of gas from sand 2,015-31 feet. Roxana Petroleum Co.'s No. 3 Taton, SE cor. SW NE NW, Section 36-31-2e, was completed for 700 bbls. in sand 1,888-1,931 feet. Ffitch and others' No. 1 Oxford Townsite lot 16, Block 17, Section 11-32-2e, is a dry and abandoned well at 2,196 feet. Fine and others' No. 1 Oxford Townsite, Lot 3, Block 18, Section 11-32-2e, is a dry hole at 2,154 feet. Shawver and others' No. 1 Oxford Townsite, Lot 8, Block 85, Section 11-32-2e, made 800 bbls. after a shot of 140 quarts in sand 2,053-2,138 feet. Ozark Drilling Co.'s No. 1 Oxford Townsite, Lot 6, Block 15, Section 12-32-2e, is dry and abandoned at 2,249 feet. Palmer and others' No. 1 Cravens, SW cor. NW, Sec-

tion 12-32-2e, is dry and abandoned at 3,205 feet. Moore and others' No. 1 Oxford Townsite, Lot 29, Block 31, Section 12-32-2e, is a failure at the depth of 2,629 feet. Trees Oil Co.'s No. 1 Oxford Townsite, Out Lot 17, Section 12-32-2e, has been abandoned at 2,292 feet. Roxana Petroleum Co.'s No. 1 Emerich, CEL SW NE, Section 14-32-2e, Oxford Townsite Pool, came in for 300 bbls. after it was shot with 100 quarts in sand 2,012-94 feet. No. 5 Community, Lot 9, Block 37, Section 14-32-2e, made 800 bbls. after the shot in sand 2,030-2,117 feet.

Roxana Petroleum Co.'s No. 4 Community, Lot 6, Block 52, Section 14-32-2e, flowed 900 bbls. from sand 2,014-2,116 feet after the shot. No. 6 Community, Lot 4, Block 86, Section 14-32-2e, was shot with 110 quarts and made 800 bbls. from sand 2,040-2,115 feet. No. 1 Van Winkle, Out Lot 28, Section 14-32-2e, made 45 bbls. after shooting 180 quarts in sand 2,074-2,132 feet. No. 1 Jeffie, C NW, Section 36-32-2e, is dry and abandoned at 3,533 feet.

Woodson County

Brinegar and others' No. 1 Rogers, SE cor. SW SE, Section 14-26-14, is dry and abandoned at 1,342 feet.

OKLAHOMA FIELDS

(Continued from Page 44)

SW cor. NW NE, Section 23-7-4, was completed for 940 bbls. in the Hunton lime at 3,782-3,932 feet. Magnolia Petroleum Co.'s No. 1 Davis, NW cor. NE, Section 24-7-4, swabbed 75 bbls. after the Hunton lime at 3,684-3,938 feet was shot with 40 quarts. Total depth is 4,175 feet in the Viola. Pierce Oil Corp. and others' No. 4 Davis, SW cor. NE NW, Section 30-7-4, topped the Hunton lime at 3,800 feet, drilled to 3,874 feet and produced 310 bbls. Magnolia Petroleum Co.'s No. 1 Harper, NW cor. NE, Section 19-7-5, has been completed for 6 bbls. in the Hunton lime at 3,876-90 feet.

Seminole County

Magnolia Petroleum Co. made location and dug cellar for No. 3 Rhoades, SW cor. NW SW, Section 12-8-6. Gypsy Oil Co. is building the rig for No. 2 Henderson, NE cor. Section 13-8-6, Bowlegs Pool. Indian Territory Illuminating Oil Co. has the rig up for No. 8-B Goforth, NE cor. NW NE, Section 15-8-6. T. B. Slick's No. 1 Coker, NE cor. SW, Section 31-8-6, is setting surface pipe. The rig is on the ground for No. 1 Goebelt, NW cor. NE SE, Section 12-6-6. Louisiana Oil Refining Co.'s No. 1 Hulwa, SW cor. NW, Section 8-5-8, Allen Field, is rigging up rotary tools. No. 1 Punluste, SW cor. Section 8-5-8, is a rig under construction.

The Prairie Oil & Gas Co.'s No. 4 C. Graham, SW cor. NW SE, Section 3-9-5, Earlsboro Pool, has been abandoned at 4,352 feet. No. 2 Aldridge "A," SE cor. SE, Section 34-8-6, has been abandoned at 4,590 feet. Continental Oil Co.'s No. 1 Pierce, SW cor. SE, Section 33-11-8, was deepened to the Wilcox sand at 4,140-46 feet and swabbed 45 bbls. Snowden & McSweeney's No. 1 Epply, SW cor. NW NE, Section 15-10-8, has been abandoned at 3,552 feet where the tools were lost. Barnsdall Oil Co.'s No. 3 Sango, SW cor. NW, Section 1-9-5, made 1,074 bbls. from the Wilcox sand at 4,361-71 feet. Gypsy Oil Co.'s No. 1 Sango, SW cor. NE, Section 1-9-5, made 1,317 bbls. after a shot of 35 quarts in the Wilcox sand at 4,339-53 feet. The Texas Company's No. 3 Anderson, SW cor. SE SE, Section 2-9-5, had the Wilcox sand at 4,328-37 feet and swabbed 450 bbls. after shooting 15 quarts. No. 5 Anderson, NW cor. SE SE, Section 2-9-5, was completed for 375 bbls. in the Wilcox sand at 4,411-27 feet. Barnsdall Oil Co.'s No. 4 Bruner, NE cor. Section 10-9-5, made 600 bbls. after shooting the Wilcox sand at 4,610-18 feet.

Magnolia Petroleum Co.'s No. 8 Holmsley, NE cor. SE SE, Section 11-9-5, swabbed 700 bbls. from the Wilcox sand at 4,424-31 feet. No. 4 Dixon, NW cor. SE SW, Section 12-9-5, Earlsboro Pool, found the Wilcox sand at 4,350 feet, drilled in to 4,361 feet and made 194 bbls. after the shot. Carter Oil Co.'s No. 7 Frazier, NW cor. NE NW, Section 3-9-6, Searight Pool, had the Wilcox sand at 4,362-75 feet and made 1,224 bbls. Twin State Oil Co.'s No. 2 Jeming, NW cor. SE NW, Section 4-9-6, made 630 bbls. by swabbing from the Wilcox sand at 4,455-59 feet. Wilcox Oil & Gas Co.'s No. 8 Cluck, SW cor. NE NW, Section 4-9-6, was completed for 323 bbls. in the Wilcox sand at 4,395-4,445 feet after plugging back to 4,389 feet.

Sinclair Oil & Gas Co.'s No. 6 Jones, SW cor. NE SE, Section 9-8-6, Bowlegs Pool, swabbed 185 bbls. from the Wilcox sand at 4,140-48 feet. No. 7 Jones, NE cor. SE, Section 9-8-6, had the Wilcox sand at 4,208-16 feet and swabbed 252 bbls. Mid-Continent Petroleum Corp.'s No. 5 Smith, NE cor. SE SW, Section 12-8-6, made 680 bbls. by swabbing the Wilcox sand at 4,658-61 feet. Carter Oil Co.'s No. 2 Burden, NE cor. SW, Section 23-8-6, topped the Wilcox sand at 4,460 feet, drilled to 4,475 feet and flowed 90 bbls. No. 2 Hilly, NW cor. NE SE, Section 23-8-6, made 660 bbls. from the Wilcox sand at 4,618-22 feet.

Blackwell Oil & Gas Co.'s No. 4 Nitey, NE cor. SE SE, Section 35-8-6, was completed for 60 bbls. in the Wilcox sand at 4,251 feet, drilled to 4,255 feet and plugged back to 4,243 feet. No. 7 Nitey, NW cor. NE SE, Section 35-8-6, Little River Pool, flowed 662 bbls. from the Wilcox sand at 4,413-19 feet. Indian Territory Illuminating Oil Co.'s No. 4 Dungan, NW cor. SW SE Section 35-8-6, made 247 bbls. from the Wilcox sand at 4,502-04 feet. No. 1 Phoebe "B," SE cor. NE SW, Section 36-8-6, swabbed 473 bbls. from Wilcox sand at 4,240-44 feet. Magnolia Petroleum Co.'s No. 6 B. Lena, NE cor. NW SW, Section 32-8-8, Wewoka Pool, found the Wilcox sand at 4,175 feet, drilled in to 4,182 feet and is pumping 70 bbls. Indian Territory Illuminating Oil Co.'s No. 12 Nitey, SE cor. NW NE, Section 2-7-6, is dry and abandoned at 4,544 feet.

Pawnee County

Superior Oil Co.'s No. 1-A Scott, SE cor. NW NE, Section 20-21-7, is a dry hole at 3,228 feet.

Payne County

Magnolia Petroleum Co.'s No. 1 Jennings, SW cor. NW, Section 10-18-5, is a rig on the ground.

Tulsa County

Black and others moved a machine to the location for No. 1-A Oswalt, NW cor. SW SW, Section 6-17-13. E. B. George's No 1-A Brown, NW cor. SW, Section 7-17-13, is spudding. Sheridan Oil Co. and others' rig is at the location for No. 1-A Morton, SW cor. NW NW, Section 12-16-12. Savoy Oil Co.'s No. 1 Agent, SE cor. NW NE, Section 8-16-14, is spudding. Transcontinental Oil Co.'s No. 2 Squire, CNL NW SE, Section 8-16-14, is drilling at 1,000 feet.

Wagoner County

M. B. Flesher's No. 1 Johnson, C NE, Section 18-17-15, is drilling at 490 feet. Peterson & Young have a machine at the location for No. 1 J. Adams, C SE NW, Section 23-16-16.

Bu-Vi-Bar Petroleum Corp.s No. 1-A Tiger, NE cor. SE, Section 30-18-15, is making 6 bbls. from sand 1,246-65 feet. Shaffer Oil & Refining Co.'s No. 1 Dan, NE cor. SW NW, Section 21-17-15, is a dry hole at 1,977 feet. Peterson & Young's No. 1 Jameson, C NE SW, Section 23-16-16, has been completed for 4,000,000 feet of gas in sand at 903-47 feet.

RENO BUYS MORE PROPERTIES

The Reno Oil Co. of Sistersville, W. Va., has bought the holdings of Heydrick & Bridwell in Wichita, Wilbarger, Young and Archer Counties, Texas, for $1,000,000 cash. There are 1,000 acres of leases on which are 154 wells producing at present 840 bbls. per day. J. P. Flynn is president of the Reno Oil Co., T. B. Gregory, vice president; W. R. Reitz, secretary and treasurer. The company has recently been active in buying producing properties in North Central and West Texas.

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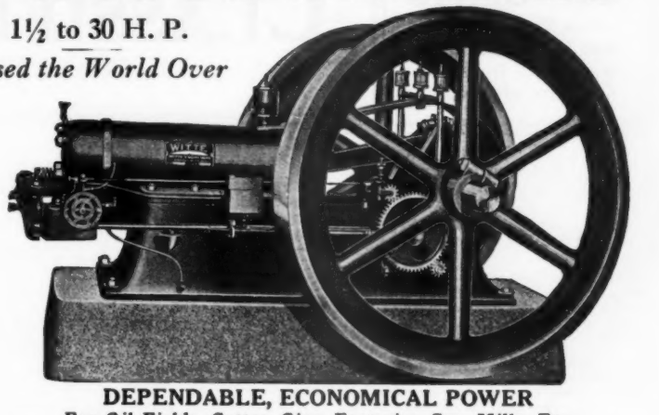

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LEASES—PRODUCTION

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P. J. MINCK,
720 So. Kenosha Avenue, Tulsa, Okla.

STOCKHOLDERS' MAILING LISTS FOR SALE—We have the stockholders names in over 1,000 oil, mining and other companies. Answer this. Will send itemized price list showing each one and price. No charge. A. F. Williams, Manager, Dept. T, 166 W. Adams, Chicago, Ill.

MR. WILDCATTER

Do you need money to finish or go below contract depth? We may be able to assist you, write stating location and depth of well, kind of rig, amount of acreage, condition of hole, contract depth and all other information possible. Send geological map and report if you have one. Box C-33, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION WANTED—50 to 100 barrels settled production. Give full particulars first letter. Will pay cash.
McDANIEL OIL CORPORATION
P. O. Box 788. Cisco, Texas

I WANT CONNECTION with responsible Oil Co., Drilling Co. or individual who will take on large prospective oil field, in new territory, for development in the near future. This field has been passed on, favorably, by leading geologists. Box 249, Holdrege, Neb.

A SURE INVESTMENT
Hardwood timber is getting scarce and the demand is growing. To close up an estate I will sell 1,500 acres fine post oak and red oak timber and land. In N. W. corner of Lamar County, Texas. Just out of Red River bottom to the North and Bois D'Arc to the West. Sure to develop oil in the near future. Price right. No chance to lose. C. I. Broad, Paris, Tex.

ONE MILLION OR MORE
Eastern capital to buy or finance industrial gas property or pipe line. Nothing less considered. None too large to handle. C. H. C. Anderson, 709 Linz Bldg., Dallas, Tex.

HAVE NEW 6-room house centrally located at St. Petersburgh, Fla., will trade for Oklahoma or Kansas royalties, leases or small producing property. Box C-153, The Oil and Gas Journal, Tulsa, Okla.

PARTNER WANTED—To develop a very promising shallow oil field in Mexico consisting of two separate tracts, one about a thousand acres, the other of about two thousand. Four holes have been drilled by owner on the smaller tract, the deepest being 514 feet; all show oil and the third hole has 390 feet of oil standing in it now. Three miles to railroad and four miles from Eagle Pass, Texas, from where development can be directed. Come on and see owner; he speaks English fluently and will give you a good deal as ever you have had in the oil game, provided you are an experienced and reliable American oil man. Very little capital required. He has permit from Mexican to develop and exploit oil for 15 and 20 years. L. Wueste, P. O. Box 183, Eagle Pass, Tex.

INCORPORATIONS

DELAWARE incorporators. Charters fees small, forms. Charles G. Guyer, 901 Market St., Wilmington, Del.

CHARTERS—Delaware best, quickest, cheapest, most liberal. Fee forms. Colonial Charter Co., Wilmington, Del.

HELP WANTED

WANTED—Chief geologist for major company. Must be ethical, up to date, well known and thoroughly experienced in Texas and Oklahoma. Right man can secure suitable salary, permanent and congenial employment and be given opportunity to make money. All replies confidential. P. O. Box 683, Ft. Worth, Tex.

A SALESMAN

Successful salesman, experience selling power plants, can secure permanent, profitable connection. Acquaintance with industrial buyers desirable. Proven products, backed by a surety bond. Sell to every industrial plant, public institution, hotel and all buildings. 100 per cent cooperation. Personal training given. Give details. Replies confidential. Position available January 1, 1928.

THE NORTH AMERICAN FIBRE PRODUCTS CO.
Cleveland. Ohio

HELP WANTED
Sales Engineer with technical education and refinery experience.
SOUTHWESTERN ENGINEERING CORP.
605 Mayo Bldg.,
Tulsa, Okla.

WANTED SALES ENGINEER
A century old Conneticut Manufacturer has an opportunity for a mechanical engineer under 30 years of age whose experience has been chiefly in the sale of products to jobbers, distributors or mill supply houses. Position as Assistant Division Sales Manager, nominal salary to start, excellent opportunity for advancement in expanding sales organization.
Requires almost continuous traveling over five or six states supervising salesmen and advertising. Box C-153, The Oil and Gas Journal, Tulsa, Okla.

POSITION WANTED

PETROLEUM And MECHANICAL Engineer. Seven years field experience, scouting core study air and gas lift production, gas plant, design and operation. Salary $300 anywhere. Box C-112, The Oil and Gas Journal, Tulsa, Okla.

ENGINEER with wide experience in the design, manufacture, sale and the development of new equipment for drilling, producing and refining. Box C-141, The Oil and Gas Journal, Tulsa, Okla.

WANTED—By January 1, 1928—Position as Production or Tool Supt.; 15 years' experience in Production and Rotary and Cable tools; 10 years with large oil Co. Best of References by large Co. Box C-151, The Oil and Gas Journal, Tulsa, Okla.

COMPETENT MAN desires connection with Oil Co. Just returned from seven years service with British Oil Co., Production Dept. Reason for not returning to present position, on account of family. Box 150, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION AND PIPE LINE Companies operating in West Texas: Do you need a capable man to take charge of your production or pipe line engineering and construction? Am graduate Engineer with twenty years experience; past three years in West Texas. Have dressed tools and bucked the tongs and can render services both practical and technical. Employed but available on reasonable notice. Box C-154, The Oil and Gas Journal, Tulsa, Okla.

ADDRESSES WANTED

WANTED the address of Roy Watkins driller. Worked at Desdemona and Mirando City, Tex., and later at Webb City, Okla. Between 35 and 40 years old. Box C-110, The Oil and Gas Journal, Tulsa, Okla.

PUBLICATIONS

THE WESTERN GOLD MINER, free trial subscription. 2586 W. 37th, Denver, Colo.

Antiknock Gasoline Market Active

Dealers Who Ordered Furnace Oils Now Trying to Speed Up Shipments. Spot Buying of Distillates and High Grade Gas Oils

By J. B. Waldo

CHICAGO, Dec. 5.—The active demand in the market on Monday was for car numbers on furnace oils shipped on previous orders or on contracts. There was some spot buying of distillates and high grade gas oils, but most of the dealers had arranged for December requirements and the somewhat colder weather made them anxious for deliveries.

In the gasoline market the high tests and the antiknock gasolines were active and the prices for the former maintained. The U. S. Motor grade was quiet as to sales and the price situation was disturbed by reports of sales made at less than 6 cents by large refiners. These quotations were not general. Neither were they confined to special parts of the territory. They seemed due to the slow movement of this gravity.

The sales of the antiknock gasolines are becoming an important factor and they are made at the expense of the U. S. Motor gravity. Some of the refiners state that their sales of their own antiknock brand are equal to one-half their gasoline business in the districts where they have it well introduced and that their sale of the higher tests continues at about the former rate. Of course the season of the year also is against the free selling of the usual summer gravity.

In fact the U. S. Motor grade is taking the place which up to a few years ago was held by the 56-58, 450 endpoint.

The market was regularly quoted at 6 cents for the U. S. Motor with a few holding for an extra eighth but an increasing number of purchases were reported by buyers at 5⅞ cents and even at 5¾ cents.

Kerosene was moving fairly well at unchanged prices which were firm. The zero gas and fuel oils were inquired for and besides the shipments ordered against December purchases there was a fair spot demand and prices for the low cold test oils were firm.

Fuel and gas oils with a cold test of about 30 degrees or over were not wanted except by a few users and these oils were hard to move and prices for them were decidedly favorable for buyers.

Routine Market

In the spot gasoline market during the week the ordinary grades of gasoline moved slowly in a routine way. There was a very considerable consumption and dealers drew on the refiners for the needed supplies either by orders against contracts or by purchases made in the spot market. On the other hand the demand for the antiknock gasolines was practically up to the output of the refineries. There were also offerings of new brands of antiknock gasoline for which great claims were made and the demand from dealers who wanted to just try them out was very considerable. The actual value to the motorists of the antiknock gasolines may be in some doubt and it may be true that a good general performance motor fuel gives the best results all things considered but the demand for antiknock gasoline was active provided the motor fuel was really what was claimed for it. And the distributors were willing and even anxious to try out these new products. Some dealers still stick to a good high test gasoline. In several instances the 68-70—350-60 gravity is being sold at a premium of 5 cents above the service station price for the U. S. Motor grade and dealers have a sufficient demand to secure them a good business on this grade which at the present cost of the 68-70 gravity gives them a good margin of profit. This fact shows that the price of gasoline is not the determining factor with many motorists. What they want is service and they are willing to pay for it.

Occasional Concessions

The spot price situation showed little change. Most of the U. S. Motor grade moved at a range of 6 to 6⅛ cents but there were occasional concessions. Two of the larger refiners were seeking the business of the quantity buyers and quoted them as low as 5¾ cents. In one case a price of 5¾ cents was made for 60-62 437 endpoint to a local buyer with a large string of stations. The individual order was for five cars but the buyer would use this amount several times during the month. Other local buyers with a considerable outlet for gasoline reported equally low prices made them by large refiners. The price was not generally made to smaller buyers here nor was it made by small refiners as is sometimes the case. Several country dealers also reported they could buy at 5⅞ cents but generally the low price with the refiners was 6 cents and some of them quoted 6⅛ cents but several would meet competition at 6 cents and possibly at 5⅞ cents under certain conditions. There are the districts where the differential rates apply where the refiners east of the Mississippi River have such a decided advantage that they are practically in control of the trade. At several parts of the territory east of Chicago the central refiner shipping from the Chicago district or from a river point has an advantage of 1½ to 2 cents in delivered cost over the Group 3 refiner. At some of these points the Group refiners are still making quotations and it is from these parts of this territory that some of the low prices are quoted. But not all. There was an evident pressure to sell gasoline and those that had gasoline which they wanted to move in quantities and at once were making some concessions. They had to do it if they insisted on making sales and they wanted the business badly enough to actually buy it.

Higher Gravities

The higher gravities were better held, practically no change in prices being recorded. The export purchases had something to do with this as some refiners who had been in the market for orders secured sufficient business to place them in a position where they were occupied for a couple of weeks, at least some stated they could not take orders for deliveries before that time. Some also advanced their price from 6¾ cents to 7 cents for the 375 endpoint. This stiffened the market for 64-66-375 endpoint although a large nearby refiner offered this gravity for re-sale late in the week at 6½ cents to several leading marketers. But again this was on the Group 3 basis and would figure a much higher return to the local refiner than the quoted price. The demand for the higher gravities was better in proportion than for the U. S. Motor grade. The antiknock fuels were in demand. Natural gasoline was fairly active in the A and AA grades but the lower grades were easier some buyers claiming they could buy C grade at less than 5 cents.

Kerosene Steady

The keronsene demand was light and prices remained steady. Some refiners stated the demand for the 42-44 gravity was as good as for the 41-43 gravity. The domestic demand is just a routine one and the buyers are doing little shopping round but place their order with their source of gasoline supplies. The improved demand for distillate it is thought might help the kerosene market if the business in the former should show the hoped-for improvement in demand. There was a better demand for distillates partly due to the colder weather and partly because of the necessity of sending shipping instructions on contracts. There was sufficient spot business to give the market a firmer tone but prices did not advance beyond the range of 3¼ to 3⅜ cents for the 38-40 straw distillate. But sellers who were asking either price were holding it firmly and there was some talk of higher prices. The trouble is that the small consumption to date has forced the accumulation of some surplus with many refiners. Consumers have not used the expected quantities and dealers have been unable to take in the full amount of their contracts so that refiners have a larger supply than they should and until they have received shipping orders on this surplus or are assured by the steady cold that they will receive them in a brief period, they are willing to let the old quotations stand but see no reason for making any lower quotations. The 36-38 gravity is selling at 3⅛ to 3¼ cents.

Zero Gas Oils

Zero gas oils are stronger in tone at least and some are asking higher prices. The straw zero oil is scarce and as the demand for furnace oils improves the inquiry for this grade is more active and the difficulty of securing a reliable oil is increased. Some dealers claimed last week they could not buy a strictly low cold test, low flash oil with a straw color at less than 3⅛ cents. Offerings of an oil that was alright except that the color was darker than a true straw and was really an amber were more freely made but the price was held at only a little less than the straw oil for refiners feel that if the demand is of any real amount the users will be forced to waive the color specification which is really immaterial in the burning value of the oil. It looks cleaner but it is just a matter of looks if the products is from a responsible, careful refiner. Refiners and marketers both reported they had received a good number of shipping instructions on contracts and previous purchases and also a fair spot business. The industrial demand was a little more active, some of the utility companies with limited storage being in the market for supplies. The larger gas companies are well supplied and continue to hold back on placing orders unless the price is low enough to prove attractive which means on a par with their costs of the oil in storage. Their viewpoint is 2¼ cents or possibly 2⅜ cents at most. There were considerable offerings of straight run gas oil at prices in quantities that permitted the dealer to resell at 2½ cents and even at 2⅜ cents if the competition was keen and the order wanted but this price was bottom under usual conditions. There was a good demand for the gravities below the 32-36 gravity provided the cold test was really low and the oil clean. There is a good consumption in the larger class of domestic burner installations in the larger buildings such as apartment houses. Such buildings with oil heat are liked by tenants. Rental agents are beginning to advertise apartments as oil heated.

Fuel Oil

Fuel oil has shown little change. Buying is for immediate needs and there is a good deal of shopping around and taking of bids. The heavier industrial fuels are moving in a routine fashion but the total is not as far short of last year as some seem to believe. There are some new sources of supply and quite a number of new sellers. Some concerns formerly known as marketers of the light oils chiefly are now doing a much larger business in number of cars handled at least in the heavier oils. They would like to do more gasoline business but cannot under present circumstances. This is one of the reasons for the increasing competition in the fuel oil business, this and the practice of many refiners to sell direct who formerly sold their fuel oils at least and many of them their entire output through marketers. The change in this direction during the past two to three years is very great. The low cold test oils are generally wanted and where a buyer is willing to take an oil with an ordinary cold test he can buy for less than the regularly quoted prices.

The offerings of fuel oils have been free in number if not so large in quantities. There have been offerings from refiners who have comparatively small accumulations of 20 to 40 cars they want to move. In some cases they have placed their oil with some seller to move at the best price he can obtain. The reduced taking by some of the railroads have also caused accumulations in refiners' storage which they would sell if possible. As a rule these larger accumulations are held with more firmness than are those of the smaller plants and this results at times in the paying of a higher price by the buyer of large quantities or over long periods. But because some of these offerings are of such comparatively small quantities they do not break prices except for one or two buyers, and the price range is only a trifle lower on standard grades of low cold test oils. Oils that are off in some desirable quality are sold for what they are worth. There is very little Smackover crude coming to this market and a good grade is hard to buy. The market is around a dollar a barrel for a good grade of this oil.

Lubs Quiet

The lubricating oil market is quiet and prices are easy to weak with some refiners discussing the issuing of new price lists which would recognize the existing market. New lubricating plants and new processes in old plants have worked for a supercompetition that results in uncertainty as to what is the price of any lubricating oil at the refinery. It is characterized as distinctly a buyers' market. There is a fairly good seasonable consumption of both motor and industrial oils but the number competing for the business seems to be practically endless. Some of the new oils produced by improved or at least new processes have been successful in securing a good number of orders but it is claimed the business has been taken at low prices. Some contracts made with dealers to handle the entire line of a refinery are stated to carry good, even high, prices but there is considerable expense involved for the refinery in the way of advertising locally and other forms of sales helps so all is not gilt even on these contracts.

There has been no change in the general tank wagon scale over the territory but many local adjustments, some of them down to meet competition as the phrase goes, and a few of them upwards. One of these is at South Bend, Ind., where sufficient influence was brought to bear to induce the major companies to cease waiting for the other and make the move towards normalcy. The latest price at the close of last week was 17.4 flat, an advance of 2.4 cents with all stations at the same price. The new price, of course, includes the tax of 3 cents. Reports of business done during November vary but the gasoline distribution is running along with occasional spurts here and there owing to local road and other conditions. It will, it is believed, show some increase as a whole over last year although in some localities dealers report that they have not done quite as well.

Bunker Fuel Now at Lowest for Years

Reduction of 5 Cents on Atlantic Seaboard Result of West Texas and Lower Freights

By N. O. Fanning

New York Bureau, The Oil and Gas Journal, Room 629, No. 101 Park Avenue, New York, N. Y.

NEW YORK, Dec. 2.—A further reduction of 5 cents a barrel in the price of bunker fuel oil on the Atlantic Seaboard by the Standard Oil Co. of New Jersey today brought the price to the lowest level so far recorded this year, $1.35 a barrel at New York, Baltimore and Norfolk, and $1.30 at Charleston. This is in line with predictions in these columns that as a result of the West Texas crude movement and lower freight rates lower fuel oil prices were probable.

It is of interest in this connection that freight rates are still tending downward. A vessel was chartered for the Venezuela-North Atlantic trade for 18¾ cents a barrel, against a previous low of 21 cents. It is pointed out that shipping interests estimate they are losing money at anything below 20 cents for this route, and therefore the fixing of a vessel at 18¾ cents indicates the existence of distress tonnage, which is inevitably forcing rates lower. However, any further decline is more likely to force vessels into idleness, which nets less of a loss than chartering them below 18 cents.

While it is possible fuel oil will go 5 or 10 cents a barrel lower, the only factor which would be likely to force prices down below that point is a reduction in the price of West Texas crude. The writer has heard rumors of a cut to 25 cents a barrel, but it is not regarded as at all certain that this will take place. At any rate, the price tendency on both heavy crude and bunker fuel oil is still downward.

The fuel oil and gasoline markets are closely bound up, in as much as the same crude yields both gasoline and fuel oil. It may possibly be that the demand for gasoline due to present warmer weather has caused refiners to hold their lower fractions for cracking purposes, which would eat into the supply of fuel oil to some extent, but the present trend of the gasoline market does not indicate this.

Aside from the fuel oil situation, the eastern markets exhibited no important change. If anything, the market dragged somewhat with indications that year-end business will not prove especially encouraging.

Gasoline

The East has seldom seen November weather such as during the past month. It was the warmest November since 1902, but on the other hand it was one of the rainiest months of the year. Nevertheless, the warmth postponed the storing for the winter of many private motor cars, and this was reflected in an unusually heavy demand. If parallel conditions existed in other parts of the country, it is possible November gasoline consumption figures will startle the industry.

The price situation in November, however, did not reflect whatever gain in consumption did occur. Prices remained at about their lowest levels, so far as the refinery and tank car markets were concerned, while retail prices were cut to new low levels in some sections.

At present the trend of the refinery market for gasoline on the Atlantic Coast is upward, but not so marked as to indicate any noteworthy improvement. Practically all refiners are asking 8¼ cents a gallon, f.o.b. refinery, in tank car lots, for U. S. Motor gasoline. No transactions were recorded below that figure after Wednesday, and business was unusually heavy at 8¼ cents. As the lowest price this year was 8 cents, the improvement as can be seen is only slight. At 8¼ cents, U. S. Motor is worth only three-quarters of a cent per gallon more than water white kerosene.

Students of the gasoline situation are of the opinion that when the gasoline market turns it will be with extreme rapidity. They point out that present prices are ridiculously out of line with all conceptions of profitable business. However, they do not predict when this turn will occur. The point is that all ideas of present price levels will have to be revised to effect real improvement from the pure profit-and-loss viewpoint.

Kerosene Firm

Meanwhile the kerosene situation, despite no marked improvement in demand, shows a steadiness which is promising, to say the least. Water white is not obtainable f.o.b. refinery for less than 7½ cents a gallon. This quotation has been maintained in the face of restricted domestic consumption and only a fair export demand. It is plain to some that refiners are unwilling to force this product on the market. They would rather build up stocks somewhat than to reduce them by forced sales. Just what they are anticipating is not plain, but nevertheless, the situation looks promising.

Warm weather is still the rule in the East, and furnace oil sales have been restricted somewhat. Nevertheless, the price has held steady throughout the territory, and the increased number of home oil-burning installations has helped to offset the weather.

There has been a trend in home oil burning toward the use of 38.40 gravity oil and this grade is now regarded almost standard as a furnace oil. The reason is that the demand for lower gravities for Diesel oil and gas-making purposes has about cleared the market of the 28-38 gravity material, so that the price differential between them and the 38-40 has almost been removed, so far as oil-burner use is concerned.

Gas and Fuel Oil

In November one of the largest marketers of fuel oil on the Atlantic Seaboard began to sell Venezuelan oil largely in place of Mexican oil previously supplied. This reduced Mexico further as a factor in the fuel oil market, and probably offset any bad effects due to the increased shipments from South America.

The market for Diesel oil continues steady at $2.10 a barrel f.o.b. Bayonne, N. J., for the marine trade. Gas oil for domestic consumption continues to be quoted at 5½ cents, f.o.b. refinery, in tank car lots.

Lubricating Oils

Increased inquiries for lubricating oils for industrial purposes encouraged the trade somewhat. Indications are that in certain important lines, increased activity is expected after the first of the year. Refiners are accordingly disposed not to press current sales, but await developments. The demand for motor oils is exceptionally good, but prices have not improved. Bright stocks are apparently in ample supply.

Paraffin Wax

The paraffin wax market is quiet. The movement at current prices is only fair and refiners are awaiting the next move. Jobbers believe themselves in a position to dictate terms and refiners are not willing to accede to this viewpoint. The result is a falling off in current business until both sides have had a chance to appraise the situation.

Petrolatum

The demand for petrolatum continues good. No further price changes were registered. While reports were current that dark geen could not be had under 2 cents a pound, in barrels, for carload lots, no actual sales were reported at that price.

Gasoline Taxes

Gasoline sales taxes in the East are trending steadily upward. With the arrival of Republican and Democratic legislative leaders to prepare for the session of the New York State Legislature at Albany, spokesmen for the automobile industry were prepared to renew the fight against a gasoline tax should Governor Smith recommend it, going even to the extent of predicting its defeat. It is believed the Governor may propose a 2-cent tax. New York and Massachusetts are the only states without a gasoline tax.

In New Hampshire, the Legislature on November 28 passed a bill providing for a 4-cent tax on gasoline, effective January 1, as against a present tax of 3 cents.

Export Situation

The oil export market was unusually quiet. A lull so far as year-end business is concerned appears inevitable. The trade can just about figure out 1927 business without waiting for developments during the remainder of December. All business transacted from now on will be for 1928 delivery. At least that is the present outlook. A marked change in price levels might alter the situation, but this is not considered probable.

The following table shows principal exports of petroleum and petroleum products from New York during the past three weeks; all figures in gallons unless otherwise noted:

Gasoline:	Nov. 30	Nov. 23	Nov. 16
Bulk	.....	7,264,700	.....
Cases	634,600	1,562,290	335,400
Kerosene:			
Bulk	.....	3,003,800	.....
Cases	2,325,940	1,879,930	552,760
Lubricating oil:			
Bulk	.....	187,300	.....
Barrels	324,600	1,159,900	899,200
Cases	50,610	271,930	52,190
Lubricating grease:			
Barrels (lbs)	337,950	.....	.....
Paraffin wax:			
Bags (lbs.)	132,000	1,288,540	979,000
Barrels (lbs.)	326,325	299,250	190,000
Petroleum asphalt:			
Barrels (tons)	.....	678	.....

The foregoing figures include all shipments of 500 bbls., 1,000 cases, or more.

Tanker Market and Movement

New low rates for tanker charters were recorded last week, including 18¾ cents from Venezuela to north of Hatteras, as against 19 to 21 on recent fixtures.

The following new fixtures were reported during the week:

Tanker Varand, 7,500 tons, refined and (or) spirit, 16s, Gulf to United Kingdom-Continent, December-January loading.

Tanker Frederico Garolla, 3,497 tons deadweight, fuel oil, 12s 6d, Constanza to Almeria, December loading.

Tanker Capena, 7,300 tons deadweight, refined and (or) spirit, 13s, Batoum or Novorossisk to United Kingdom, December loading.

Tanker Paraguay, 4,400 tons deadweight, gas oil, private terms, Baltimore to Spanish Mediterranean, November loading.

Tanker Pueblo, 6,008 tons deadweight, lubricating oil, private terms, New York to Mediterranean, December loading.

Tanker Raila, 8,000 tons deadweight, refined and (or) spirit, 17s, Gulf to Cette or Azeu, end of December loading.

Tanker Chuky, 9,000 tons, crude, California to Japan, middle January, 70 cents a barrel.

Tanker Sunoil, clean, Gulf to north of Hatteras, clean oil, 19 cents, December loading.

Tanker W. L. Steed, same, to Wilmington, 17 cents, north of Hatteras, 20 cents.

Tanker San Lorenzo, two trips, fuel oil, San Francisco to Yokahoma, 70 cents.

Tanker San Melito, same, one trip.

Tanker Shreveport, same, one trip.

Tanker Beaconoil, Curacao to New York, 19¾ cents, December loading.

Tanker Vaba, same.

Tanker Lustrous, Gulf, December, to United Kingdom-Continent, 16s.

Tanker Federal, Gulf to Banes, Cuba, 38 cents, January loading.

Receipts of crude and refined oil at Atlantic Coast ports by tankers for the week ended November 30 are estimated at 3,668,000 bbls., a daily average of 524,000 bbls., as compared with 3,700,000 bbls., or a daily average of 529,000 bbls., for the week ended November 23.

The importation of oil from South America reached the high estimated total of 840,000 bbls., or a daily average of 120,000 bbls. Mexico contributed only 39,000 bbls., or a daily average of 6,000.

The following table shows estimated daily average receipts of crude and refined oil by water at Atlantic Coast ports for the last three weeks; also monthly record for the past 12 months, (figures in barrels):

	Week Ended		
	Nov. 30	Nov. 23	Nov. 16
Gulf Coast	320,000	329,000	215,000
Pacific Coast	78,000	22,000	45,000
Mexico	6,000	61,000	41,000
South America	120,000	117,000	114,000
Total	524,000	529,000	415,000

Daily Averages by Months

	Gulf	Pacific	Mex.	S. Am	Total
1927—					
Nov.	318,000	62,000	42,000	109,000	531,000
Oct.	314,000	98,000	38,000	91,000	541,000
Sept.	336,000	97,000	69,000	99,000	601,000
Aug.	397,000	90,000	80,000	78,000	645,000
July	406,000	83,000	78,000	49,000	616,000
June	378,000	118,000	68,000	47,000	611,000
May	332,000	58,000	91,000	53,000	534,000
April	388,000	93,000	69,000	61,000	611,000
Mch.	345,000	103,000	36,000	81,000	565,000
Feb.	379,000	89,000	40,000	48,000	556,000
Jan.	362,000	73,000	49,000	61,000	545,000
1926—					
Dec.	363,000	57,000	49,000	61,000	530,000

The foregoing figures are based on the carrying capacity of incoming oil-laden tankers.

CHANGE IN CANADIAN OIL COMPANY CHARTERS

CHATHAM, Ontario, Dec. 3.—It is understood that a long-standing controversy affecting oil company incorporations has been settled as a result of the recent premiers' conference at Ottawa. As a result of the compromise reached, after March 31, 1928, provincial governments will have power to regulate the sale within their jurisdiction of issues of stock of both Federal and provincial companies.

At the time of the first Calgary boom, most Alberta incorporations were under provincial charter. Following the boom, rigid blue sky legislation was enacted by the provincial government; as a result of which the newer incorporations have been mostly secured under Federal charter, which gave the companies a freer hand. The new arrangement will apparently subject the companies holding Federal charters to the same jurisdiction as the provincial corporations, though it is thought the present provincial requirements may be a little modified.

TRADE COMMISSION CHAIRMAN

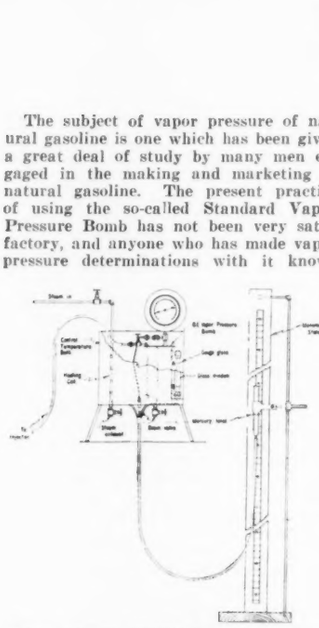
Commissioner William E. Humphrey of Seattle, Wash., has assumed the duties of chairman of the Federal Trade Commission, succeeding Commissioner C. W. Hunt. Mr. Humphrey was elected by the commission to serve until November 30, 1928.

Determining Gasoline Vapor Tension

New Method Suggested for Natural Gasoline Industry by Bureau of Explosives. Results of Experiments Given

By C. D. Gard*

The subject of vapor pressure of natural gasoline is one which has been given a great deal of study by many men engaged in the making and marketing of natural gasoline. The present practice of using the so-called Standard Vapor Pressure Bomb has not been very satisfactory, and anyone who has made vapor pressure determinations with it knows



Vapor pressure apparatus using new B. E. bomb assembly.

that the results were neither consistent nor accurate. Several attempts have been made to design a bomb which would give a more accurate method for vapor pressure determination.

The method herein discussed deals with that proposed by C. P. Beistle of the United States Bureau of Explosives. The fundamental principle involved is one in which the vapor pressure of the liquid in the presence of the entrapped air is measured. This measurement is accomplished by taking one pressure reading on the mixture, doubling the volume by withdrawing liquid, allowing the pressure to become constant and holding the temperature constant, then taking the second pressure reading. The vapor pressure of the mixture is then computed from the two pressure readings. In this manner the vapor pressure of any foreign vapor or gas such as air is cancelled out of the calculation and the result gives the vapor pressure of the liquid in the bomb.

It all looks very simple and logical enough and a sufficient number of tests were performed by the proponent of this method to indicate that reliable results could be obtained.

Principles Involved

However, before going into the actual performance of the method let us review the principles involved and the results which we are trying to get. First, we will consider a true liquid, this definition applying to such substances as water, alcohol, ether, carbon bisulphide, acetone, etc. If we should take any one of these pure liquids and pour it into a closed vessel, leaving a vapor space above the liquid, then the total pressure on the walls of this vessel would be the pressure of the air plus the pressure of the vapor, each constituent present acting as though the other constituents were not present. Now if we withdraw a portion of the liquid from the container until we have doubled the vapor volume above the liquid and we do not vent any of the vapor, the volume of air in the container remains the same as originally but it is in a space twice as great. Therefore the pressure exerted by the air is one-half the first pressure. However, since the temperature of the container has held constant the vapor from the liquid will exert the same pressure as originally.

*Fall meeting of California Natural Gasoline Association at Los Angeles, November 15 and 16.

The pressure of the vapor of the liquid may then be calculated as follows:

Let X=pressure exerted by air at first reading;

P=pressure exerted by vapor at first reading;

Then total pressure at first reading A=P+X.

At the second reading:

X=pressure exerted by air;

$$\frac{}{2}$$

P=pressure exerted by vapor;

Then total pressure at second reading, B=X+P;

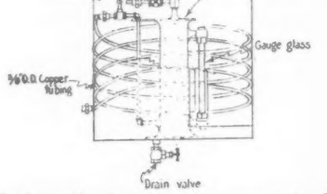
$$\frac{}{2}$$

Therefore P=2B—A.

Now let us further consider just what happened when we withdrew liquid from the container. First, we lowered the pressure on the liquid because we increased the vapor space above the liquid. The result of this lowering of pressure was a vaporization of the liquid, this vaporization continuing until the pressure exerted by the vapor is that pressure corresponding to the temperature at which the contents are held. At all times the vapor which came from the liquid is exactly of the same material as the liquid. Next, the pressure exerted on the walls of the vessel is the sum of the pressures of the vapor constituents. If we could separate this vapor from the liquid and hold it at the same volume and temperature we would find that it would still exert the same pressure as when in the presence of the liquid.

Results Obtained

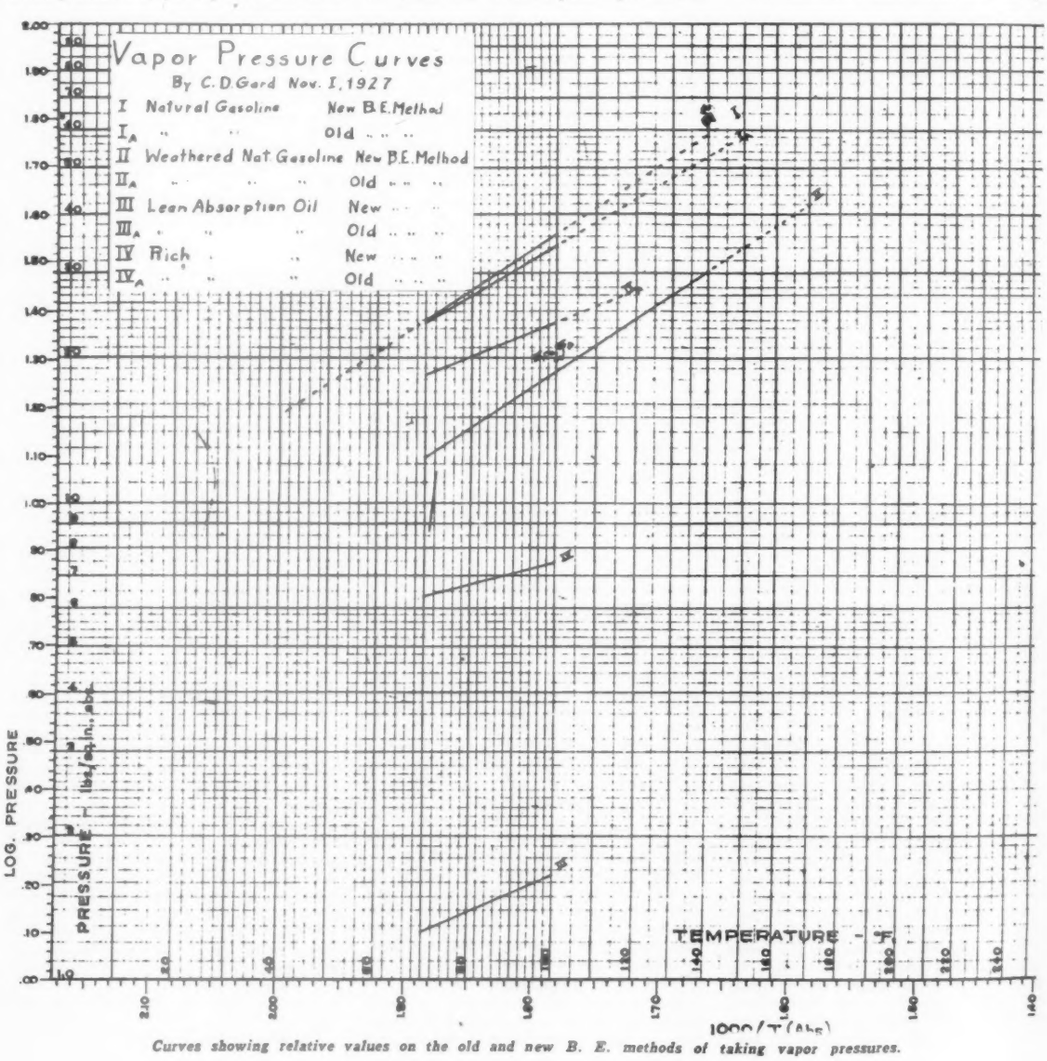
A vapor pressure test run on a pure liquid checked very closely the known



Iced sampling device for vapor pressure bomb.

vapor pressure of the liquid. This test further substantiated the claims of accuracy for the method used, hence it was decided to run some vapor pressure tests on gasoline. The first difficulty we found was that the sample to be tested had to be weathered to atmospheric pressure if we were to pour it into the bomb as specified. To overcome this and in order to get the actual vapor pressure of gasoline stored under pressure, the apparatus was changed to include a valve immediately below the gauge so that the bomb could be filled under pressure. Tests were then conducted and much to our surprise we found that the indicated vapor pressure was much below the pressure on the storage tank. As there were several possible errors in assuming that the storage pressure of gasoline was the true vapor pressure of the gasoline at the storage temperature, a large container was built and filled completely with gasoline under the storage pressure. A small amount of gasoline was then withdrawn from the large container to form a vapor space above the liquid. In this way we were convinced we could obtain the true vapor pressure of the liquid. The tests were continued and it was found that the vapor pressures as indicated by samples drawn from the bottom of the container were still lower than that pressure indicated by the gauge on the container but the difference was less. It was then noted that there was considerable wire drawing of he gasoline through the valves on the bomb and that perhaps light vapors were being vented from the top valve on the bomb.

To eliminate this error the samples


Vapor Pressure Curves
By C.D.Gard Nov. 1, 1927
I Natural Gasoline New B.E.Method
IA " " Old " " "
II Weathered Nat Gasoline New B.E.Method
IIA " " " Old " " "
III Lean Absorption Oil New " "
IIIA " " " Old " " "
IV Rich " " New " " "
IVA " " " Old " " "
LOG. PRESSURE
PRESSURE lbs./sq. in. abs.
TEMPERATURE - T°
1000/T (Abs.)

Curves showing relative values on the old and new B. E. methods of taking vapor pressures.

were then drawn through a coil placed in an ice-salt bath, the bomb was purged with gasoline and completely drained before filling for the test. No vapors were vented from the top. By keeping the bomb also submerged in the ice-salt bath it was found that the bomb could be completely filled with gasoline. The vapors which remained in the bomb after purging condensed at the lower temperatures and at the same time those vapors liberated from the gasoline in drawing the sample were also recondensed. When the vapor pressure test was conducted it was found that the pressure checked very closely with the pressure on the large container. The gasoline tested had a vapor pressure of about 10 pounds, gauge at 70 degrees Fahrenheit.

However, when gasoline which was held under a storage pressure of 30 pounds was tested in a similar manner it was found that the vapor pressure indicated by the bomb was much lower than that pressure indicated by the gauge on the large container. Further study was then required to solve the mystery.

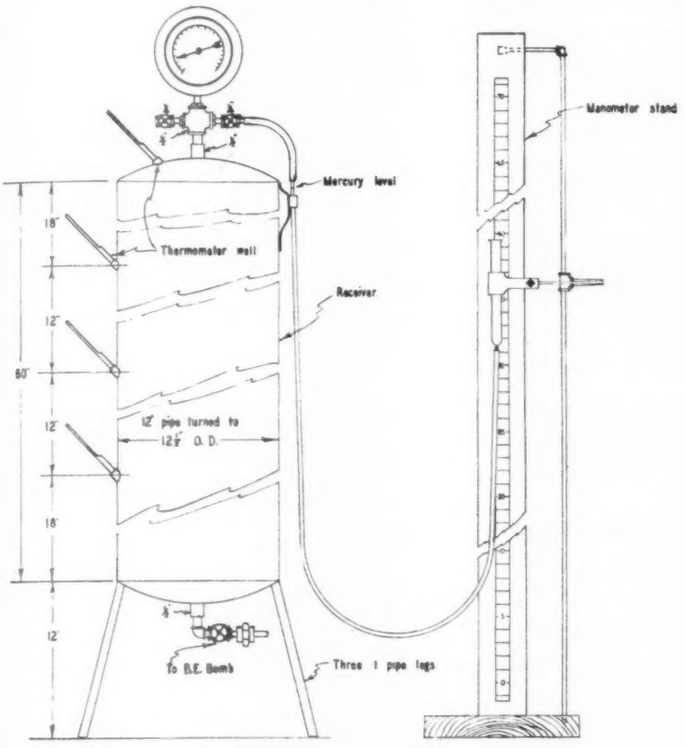
Explanation of Difference

Going back to a previous statement made in this paper, that the pressure exerted is due to the vapor above the liquid, we find a plausible reason for the difference between the vapor pressure of by pulling out the piston and increasing the vapor space above the liquid, at the same time holding the temperature constant. It can readily be seen that, by increasing the vapor space, at some point all of the lightest material will be vaporized from the liquid and as soon as that point has been approached the vapor pressure will start to decrease.

Now if we fill the bomb with gasoline of this nature and draw the liquid down to the A mark, it is possible that at this point all of the very light material (say a small percentage of propane) may be vaporized. Now when the liquid is drawn to the B mark, the character of the vapor will be changed and the vapor pressure will be much lower. In this particular case the pressure exerted by the light fraction would be only one-half as much at "B" as it was at "A". To prove this point the vapor pressure bomb was completely filled and then drawn down to various marks at constant temperature. The pressure was noted. Under these conditions the air dilution was a minimum amount.

Liquid Level	Press. Lbs. Abs. at 70°F
Above A mark	39.5
A mark	39.4
Half between A and B mark	37.8
B mark	36.5
Below B mark	36.0

Thus it is shown that the true vapor



Gasoline pressure receiver.

the bomb and the vapor pressure of the container. Natural gasoline is a volatile liquid made up of a series of hydrocarbon compounds having a wide range of boiling points. To get an exaggerated view of just what happens when vaporization of a liquid like natural gasoline occurs, let us consider the Engler distillation of such material. You have probably observed that the greater portion of material, which shows up as loss, comes off at the first part of the distillation, and as the distillation progresses the material vaporized becomes heavier. Now if we were to collect the vapors from the distillation and make a continuous vapor pressure test as the distillation progressed, we would find that the vapor pressure would rapidly decrease.

The first vapor pressure would be on the very lightest fractions and would be very high and as the vapors became heavier the pressure would lower. In a similar manner, if the liquid was contained in a cylinder held at constant temperature and a movable piston was fitted to one end, the other end being closed, we could get a vaporization of the liquid pressure cannot be obtained in this manner. However, the narrower the boiling range of the material tested the closer the vapor pressure indicated by the bomb will be to the true vapor pressure.

Correction Factor

By the use of a mercury U gauge and small bore tubing with special fittings at the top connection on the bomb, thus reducing the air space to a minimum, it may be possible to obtain a correction factor to apply for the error due to the small amount of air present above the liquid. This may be accomplished with running several vapor pressures on a pure liquid by purging the bomb and then completely filling it in an ice-salt bath and computing the error due to air. The liquid would be drawn down only a sufficient amount to give a vapor space. By making several tests in this manner the error in natural gasoline vapor pressures might be obtained and a correction chart made. Further study might be made to determine just how much liquid could be withdrawn before actually lowering the vapor pressure.

Sufficient work has already been done to give relative values on the old and new B. E. methods of taking vapor pressures. A wide range of material was selected for these tests. The results are shown on the curve sheet. Curve I represents vapor pressures taken on a natural gasoline by the new method and curve I-A vapor pressures on the same kind of gasoline by the old method. It will be noticed that the two curves are relatively close but that the new method gives vapor pressures of a higher value. Curves II and IIA are for a weathered gasoline and here it will be seen that the old method gives a higher vapor pressure. Curves III and IIIA are for lean absorption oil and show similar results but to a greater degree. Curves IV and IVA are for rich absorption oil, showing how light material affects the relative pressures obtained by the two methods.

Indications are that where light material is present in large quantities the two methods will give similar results, but where the material tested is heavy the presence of air in the bomb used in the old method will give a much higher vapor pressure.

WILDCAT OPERATIONS IN PANHANDLE

(Continued from Page 40-B)

Shamrock Pet. Co. et al's No. 1 J. B. Back, SE NW SW, Sec. 44, Blk. 25 ..... T.D., 2,335 ft; rig burned and rebuilt; 30,000,000 ft. gas.
Shamrock Oil Co.'s No. 1 W. S. Clayton ..... New loc.
Skelly Oil Co.'s No. 1 Bradford, NE cor., Sec. 118, Blk. B-2, H. & G. N. Sur. ..... Build. rig.
Skelly Oil Co.'s No. 1 W. Jackson ..... Drlg., 2,685 ft.; 6,000,000 ft gas.
Skelly Oil Co.'s No. 2 Jackson ..... Drlg., 1,200 ft.
Spartan Oil Co.'s No 1 J. Hopkins ..... Rig.
Sullivan et al's No. 1 A. Chapman ..... Rig on ground.
Sullivan et al's No. 1 A. Chapman-A ..... Rig; moving in tools
Sun Oil Co.'s No. 1 W. Jackson ..... Driving 20-in. at 300 ft.
Staggers Oil Co.'s (was Ruby Oil Co.'s) No. 1 B. F. Tally ..... T.D., 635 ft.; S.D.
The Texas Company's No. 1 J. B. Bowers ..... Drlg., 1,820 ft.
The Texas Company's No. 2 J. B. Bowers ..... Drlg., 1,830 ft.
The Texas Company's No. 3 J. B. Bowers ..... Drlg., 200 ft.
The Texas Company's No. 1 S. McLarty ..... Cellar.
The Texas Company's No. 4 G. H. Saunders ..... Drlg., 1,675 ft.
J. Williams et al's No. 1 C. W. Bradford, Sec. 123, Blk. B-2 ..... Rig on ground; T.A.
Young et al's No. 1 Holmes ..... 3,350 ft; 2,000 ft oil in hole (was comp. in Oct., 1926 for 300 bbls. at 3,135-80 ft.); 3,385 ft.; some salt wtr. here; to plug back.

HALE COUNTY

Bailey & Young's No. 1 Thomas, Sec. 1, Blk. J.K.L. ..... S.D., 175 ft.
Donnell Pet. Co.'s No. 2 Mullican, NW cor. Sec. 66, Blk. A-3, I. & S. B. Sur. ..... Top pay in sandy shale, 405 ft ½ baller oil and 3 bailers wtr per day; S.D., 620 ft.
Donnell Pet. Co.'s No. 1 Mullican, C Sec. 21, Blk. B, R. M. Thompson Sur. ..... 200 ft. fluid in hole from 407-14 ft; S.D.
Explin. Co.'s No. 1 Crawford, C NE, Sec. 17, Blk. C-3, T. T. R. R. Sur. ..... Spudded and S.D.
Explin. Co.'s No. 1 Goodman ..... Spudded and S.D.
A. S. Mimm's No. 1 W. A. Ritcher, 700 ft. from east line and 1,200 ft. from south line, Sec. 17, Blk. X, John Glynn Sur. ..... S.D., 1,140 ft.
Tolbert & Simms' (was Gouldy & Stone's) No. 1 Kitteral, SE cor. NW, Sec. 65, Blk. A-3, G. C. & S. F. Sur. ..... S.D., 485 ft.

HALL COUNTY

Briscoe Oil Assn.'s (was Seifert et al's) No. 1 Owens, C NE, Sec. 179, Blk. S-5, Dennison & Pacific Sur. ..... Spudded and S.D.

HANSFORD COUNTY

Caldwell et al's No. 1 J. Adriance est. ..... Drlg., 345 ft.
Oklavania et al's No. 1 Coots, Sec. 13, Blk. 45, H. & T. C. Sur. ..... S.D., 560 ft.

HOCKLEY COUNTY

World Oil Co.'s No. 1 Ellwood ..... Drlg., 1,455 ft.

HARTLEY COUNTY

Deep Rock Oil Co.'s No. 1 Lymann & Balfour, Sec. 9, ... Preparing to abd., 4,038 ft.
Eslick et al's No. 1 J. R. Irving, Sec. 13, Blk. 13 ..... Topped granite wash, 3,103 ft show oil, 3,226 ft; hole full wtr., 3,745-55 ft; S.D., 4,000 ft.

HEMPHILL COUNTY

Hoover et al's No. 1 Schaller est., Sec. 4 ..... Spudded and S. D.
Hoover et al's No. 1 fee, J. S. Hood Sur. ..... Set 5-in. pipe, 4,825 ft; hard lime.

HUTCHINSON COUNTY

R. G. Barnum et al's No. 1 Garland Sanford, Sec. 78, Blk. 46 ..... Rig.
Beam et al's No. 1 Cockrell, Sec. 3, Blk. 23 ..... S.D., 405 ft. for orders.
Big Coach Oil Co.'s No. 1 Dunnaway, Sec. 5, Blk. Y ..... S.D., 750 ft.
Conklin et al's No. 1 Johnson, Sec. 1, Blk. X03, H. & O. B. Sur. ..... S.D., 600 ft.
Harris et al's No. 1 J. Q. Bost, Sec. 10, Blk. Y-2, T. T. R. R. Sur. ..... Location.
McMan O. & G. Co.'s No. 1 Albert Yake ..... S.R., 1,460 ft.
Phillips Pet. Co.'s No. 12 Elva-Whittenburg, E. Tomlinson Sur. ..... T.A., 4,445 ft.
Phillips Pet. Co. & White Eagle O. & R. Co.'s No. 1 Lee Bivins ..... Set 6-in., 2,944 ft.
Prairie O. & G. Co.'s No. 1 Burnett est. (Clark) ..... Top pay, 2,955 ft; T.D., 3,045 ft; 200 ft. oil in hole; C.O.
Prairie O. & G. Co. and Vacuum Oil Co.'s No. 2 Cal Merchant ..... Setting 12-in. pipe, 990 ft.
Skelly Oil Co.'s No. 2 Armstrong & Byrd ..... Drlg. water well.
Skyrocket Oil Co.'s No. 1 Mrs. R. A. Jameson ..... Run. 5-in. to 3,000 ft.
The Texas Company's No. 1 Cockrell-B ..... Drlg., 2,130 ft.
The Texas Co.'s No. 1 T. D. Lewis ..... Shot of 110 qts., 2,925-85 ft; top pay lime, 2,925 ft; T.D., 3,090 ft; 100 ft. wtr. in hole, from 3,080-90 ft; C.O.
Timms et al's No. 1 C. R. Garner ..... Drlg., 510 ft.

KING COUNTY

Humble O. & R. Co.'s No. 1 Pitchfork, Sec. 171, Blk. A-96, John H. Gibson Sur. ..... Drlg., 2,825 ft.
J. L. Pattison's No. 1 Patton ..... Slight show gas, 2,115-30 ft; drlg., 3,090 ft.

LAMB COUNTY

Dan Freel et al's No. 1 Ellwood, CWL, Sec. 9, Blk. T, T. A. Thompson Sur. ..... Rig.
Tolbert & Simms' No. 1 Elwood, NE SW SW, Sec. 14, Blk. B., R. M. Thompson Sur. ..... S.D., 712 ft; small show oil and hole full wtr; bailing.

LIPSCOMB COUNTY

Cal-Tex's No. 1 Bradford, C NE NE, Sec. 899, Blk. 43, H. & T. C. Sur. ..... Spudded and S.D.
Camp Creek Oil Co.'s No. 1 Mrs. H. D. May, Sec. 612, Blk. 43 ..... S.D., 1,400 ft.
McCorkle's No. 1 A. Barton, NE cor. SW SE, Sec. 504, Blk. 43, H. & T. C. Sur. ..... Water in lime at 4,126-40 ft; 6-in. set, 4,155 ft; drlg. lime, 4,450 ft.
Ozark Drlg. Co.'s No. 1 Frass, NE SE, Sec. 106, Blk. 10, H. & T. C. Sur. ..... Rig on ground.
Smith, Kinsley & Ruby's No. 1 C. W. Jones, NE cor. SW, Sec. 100, Blk. 43 ..... Show oil, 3,520 ft; salt water at 3,900 ft; drlg., 4,200 ft.

LUBBOCK COUNTY

Center Oil Co.'s No. 1 Bowles ranch ..... Small show oil, 1,133-40 ft., in sand; drlg., 2,625 ft.

MOORE COUNTY

A. O. Duggan's (was Shadler Bros.') No. 1 John Lowery, Sec. 237, Blk. 44 ..... Topped lime, 2,680 ft; set 8-in. at 2,770 ft; 4,000,000 ft. of gas, 2,980-3,020 ft; 15,000,000 ft. gas 3,100-50 ft; (actual gauge); very slight show oil in lime; S.D., 3,652 ft.
Prairie and Shamrock's No. 2 Gober, Sec. 16, Blk. M-21 ..... T.D., 2,520 ft; recement 12-in. at 1,525 ft; C.O., 300 ft. off bottom.

MOTLEY COUNTY

Expltn. Co.'s No. 1 Burleson — Spudded and S.D.
Expltn. Co.'s No. 1 Tillson — S.D., 750 ft. for repairs.
Expltn. Co.'s No. 1 Matador Land & Cattle Co., C SW, Sec. 37, John Gibson Sur. — S.D., 1,002 ft.
Wheeler et al's No. 1 C. D. Bird, C NE, Sec. 4, Blk. S, Stephens Sur. — Spudded and S.D.

OLDHAM COUNTY

Prairie O. & G. Co.'s No. 1 Landegrin, SE cor. NE SW, Sec. 46, League 310, Capital land — 1,900 ft. wtr., 4,085-93 ft; 1 bailer wtr. per hr. and light scum oil 4,527 ft. (steel line meas.) cmt 6-in., 4,442 ft; 2,000 ft. salt wtr. 4,850-56 ft; T.D., 4,918 ft; fish for U.R. lugs, 4,920 ft.

POTTER COUNTY

Frank Allen et al's No. 1 W. H. Bush — Location.
Prairie O. & G. Co.'s No. 1 Lee Bivins, 660 ft. N. and 330 ft. W. of SE cor., Sec. 39, Blk. M-20, G. & M. Sur. — Set. 24-in. pipe, 110 ft.

ROBERTS COUNTY

Big Bend Oil Co.'s No. 1 Mrs. H. Ledrick & Sons, Sec. 7, Blk. 5-A — Show gas, 4,990 ft; show oil, 4,992 ft; cas. set, 4,992 ft; S.R. for 3-in. pipe; T.D., 5,153 ft.

SHERMAN COUNTY

Gibson Oil Co.'s No. 1 Bivins, Sec. 35, Blk. 3-B — 100,000 ft. gas, 2,016-26 ft; T.D., 3,353 ft; 2,000 ft. salt water 3,325-33 ft; fish. for U.R. lugs.
Phillips Pet. Co. and Prairie O. & G. Co.'s No. 1 Price & Fuqua, C NE, Sec. 33, Blk. 2-B, G. H. & H. Sur. — 100,000 ft. gas, 2,105-10 ft; T.D. 3,420 ft; 2,000,000 ft. gas, 3,325-3,420 ft. lime; rig burned; rebuilding rig.

WHEELER COUNTY

E. L. Arnold's No. 1 M. J. Williams — Show gas, 1,644 ft; T.D., 1,790 ft; fishing bit.
Byrens et al's No. 1 Johnson, SW cor. NE, Sec. 88, Blk. A-5, H. & G. N. Sur. — S.D., 450 ft.
Clark et al's No. 1 J. W. Gordon — Spudding.
Foster et al's No. 1 S. H. McDonald, SE cor. NW SW, J. N. Lindsay Sur. — Spudded.
Hatcher et al's No. 1 J. Hatcher, C NE SW, Sec. 80, Blk. 23, H. & G. N. Sur. — T.D., 1,460 ft; 1,000,000 ft. gas cmt. 6-in.
Piney O. & G. Co.'s No. 1 W. S. Walker, Sec. 44, Blk. 24, H. & G. N. Sur. — Drlg., 1,270 ft. with crooked hole and rocked to 700 ft. to straighten.
Rook & Angus'No. 1 Smock (Linkey) C SE SE Sec. 5, Blk. 24, H. & G. N. Sur. — Rigged up and S.D.
Smith Brady et al's No. 1 P. J. Sorenson, Sec. 53, Blk. A-4 — S.D., 2,120 ft. for orders.
The Texas Company's No. 1 Morgan, Sec. 92, Blk. 17 — 21,000,000 ft. gas, 1,850-2,017 ft. S.D.
The Texas Company's No. 2 Morgan — Rig.
Vaughan et al's No. 1 M. Ackley — Location.
Pete Woodley's No. 1 J. Boyle — Spudding.

WILDCAT OPERATIONS IN WEST TEXAS

(Continued from Page 40-C)

Gulf Prod. Co.'s No. 3 Thompson — Drlg. 500 ft.
C. A. Jones et al's No. 1 Powell — Top salt 1,650 ft.; hole full water 2,245 ft.; top pay 2,612 ft.; total depth 2,621 ft.; 1,500 ft. oil in hole.
James Kelly et al's (was Corbett & Gill's) No. 1 Todd, C NE Sec. 43, Blk. WX, G. C. & S. F. Sur. — Top salt 993 ft.; show oil 1,948 ft.; 700 ft. sulphur water in hole 2,450 ft.; total depth 2,605 ft.; plugging back to shoot.
Van McPhail's No. 1 George Thompson — Location.
Van McPhail et al's No. 1 George Thompson — Location.
Magnolia Pet. Co.'s No. 2 Shannon — Show oil 2,385-90 and 2,992 ft.; total depth 4,100 ft.; fishing 26 joints 8-in. casing.
Osage Oil Corp.'s No. 1 H. M. Halff — Shut down 60 ft.; will skid rig.
Bob Penn's No. 1 L. P. Powell — Drlg. 2,005 ft.
William Shaffer et al's No. 1 University, C SE SE Sec. 9, Blk. 47, University Sur., elev. 2,344 ft. — Shut down 2,344 ft.
William Schaffer et al's No. 2 University, 1,350 ft. N and 2,610 ft. E of SW cor. Sec. 9, Blk. 47, University Land — Top salt 1,060 ft.; first oil show 2,190-96 ft.; second 2,225-29 ft.; 1 bailer oil in 10 hrs. at 2,590 ft.; shut down 2,635 ft.; brown lime.
Simmons Oil Co. et al's No. 1 H. M. Halff, NW cor. Sec. 69, Blk. 1, I. & G. N. — Top salt 445 ft.; drlg. 625 ft.; show oil 610 ft.
W. W. Donnelly & Young's No. 1 Massey, Sec. 29, Blk. U-V — Drlg. 300 ft.
McManmon Oil Co.'s No. 1 Blakeney — Will plug at 4,050 ft., total depth.
World Oil Co.'s No. 1 Schneeman-B, Sec. 50, Blk. BB, G. C. & S. F. Sur. — Top salt 1,070 ft.; hole full sulphur water 2,210-15; shut down 2,310 ft.
Young & Donnellys' No. 1 J. M. Shannon, C Sec. 11, Blk. 9, D. & S. E. Sur. — 6,000,000 ft. gas at 1,662 ft.; shut down 1,676 ft.

CULBERSON COUNTY

Deep Rock Oil Co.'s No. 2 Kioh-Rumsey, Sec. 21, Blk. 29, T. & P. Sur., T-1 (NE of No. 1) — Drlg. 1,210 ft.
James H. Gardner et al's No. 1 Radford, C SE Sec. 29, Blk. 62, Public School Land Sur. — Shut down 700 ft.
Scott & Dittman's No. 1 Miller, SW cor. NW NE Sec. 1, School Blk. 97 — Drilling 200 ft.

ECTOR COUNTY

The Texas Company and Cosden's No. 1 W. E. Connell, SE cor. Sec. 24, Blk. B-16, School Land — Top salt 925 ft.; drlg. 2,710 ft., anhydrite.

FISHER COUNTY

Cranfill & Reynolds' No. 1 J. A. Young, Sec. 208, B. B. B. & C. Sur. — Drlg. 1,720 ft.
Ideal Oil Co.'s No. 1 Jameson, C SE Sec. 111, Blk. 1, H. & T. C. Sur. — Hole full salt water 2,345-2,520 ft.; shut down 3,304 ft.
Marland Oil Co. and Texon's No. 1 McCall, Sec. 108, Blk 3, H. & T. C. Sur. — Rig.
Marland Oil Co. and Vacuum Oil Co.'s No. 1 J. H. R. Lagow — Rigging up at 3,500 ft. to deepen.
R. W. Raney's No. 2 Maberry, Sec. 56, Blk. 1, T. & P. Sur. — Shut down for orders 2,725 ft.
The Texas Company's No. 1 D. S. Stevens, C SW SE SE Sec. 79, Blk. 1, H. & T. C. Sur. — Drlg. 2,260 ft.

FOARD COUNTY

Clark et al's No. 1 Atkins — Lime 1,580-1,930 ft.; show gas 1,885 ft.; drlg. 2,360 ft.
Fain-McGaha Oil Corp. et al's No. 1 Mathews — Total depth 2,550 ft.; plugged back to 1,506 ft.; swabbing sand 1,484-92 ft.; makes 8 bbls. gas dead oil.
The Texas Company's No. 1 Watkins — Drlg. 3,020 ft.

GAINES COUNTY

Westheimer & Daube's No. 1 Birge & Forbes Land Co., Sec. 308, Terrell County School Land — Cemented 8-in. 3,900 ft.; underream. 4,650 ft. (approx.).

GARZA COUNTY

Emerald Oil Co.'s No. 1 D. Boren, NW cor. N ESec. 137, Blk. 5, H. & G. N. Sur. — Small show oil in gray lime 1,884-1,902 ft.; shut down 2,600 ft.; show oil and hole full water 2,420-60 ft.
Gulf Prod. Co.'s No. 1 E. P. Swenson-A, Sec. 67, Blk. 2, H. & G. N. Sur. — Top salt 435 ft.; drlg. 1,416 ft.

GLASSCOCK COUNTY

Texon & Marland's No. 1 Settles — Drlg. 1,320 ft.

HOWARD COUNTY

California Co.'s No. 1 Fisher Bros., SE SW NW Sec. 36, Blk. 33, T. & P. Sur., T-1-S — Shows oil 1,530-48 ft. and 1,562-64 ft.; hole full water 2,020-34 ft.; hole full salt water 2,750-75 ft.; top lime 3,065 ft.; fishing tools 3,225 ft.
Coyle-Concord Oil Co.'s No. 1 Dora Roberts — Cem. casing 1,588 ft.
Coyle-Concord Oil Co.'s No. 3 Dora Roberts, Sec. 156, Blk. 29 — Location.
Dixie Oil Co.'s No. 1 H. R. Clay — Drlg. lime 2,490 ft.
Henshaw et al's No. 1 W. R. Settles, SW SE SW Sec. 135, Blk. 29 — Hole full sulphur water 1,335-50 ft.; total depth 1,900 ft.; shut down.
Lockhartt & Co.'s No. 1 Dora Roberts, Sec. 157, Blk. 29 — Location.
Marland Oil Co.'s No. 1 Clay-E, NW NE SE Sec. 138, Blk. 29 — Pay 2,480-2,500 ft.; swabbed approx. 160 bbls.; hole full salt water 3,360-70 ft.; drlg. 3,385 ft.
Marland Oil Co.'s No. 2 Clay-E — Rigging rotary.
Marland Oil Co.'s No. 1 Richardson, C NW Sec. 12, Blk. 32, T. & P. Sur., T-1-S — Top salt 870 ft.; drlg. 1,095 ft.
Marland Oil Co. and Zoch's No. 1 Jones, Sec. 32, Blk. 27, T. & P. Sur., elev. 2,218 ft. — Drlg. 1,475 ft.
Mayo, Nixon & Flowers' No. 1 W. J. Flowers — Drlg. 200 ft.
Miley and Marland Oil Co.'s No. 1 C. D. Read, C NW Sec. 12, Blk. 31, T. & P. Sur., T-1-N — Rig.
Owens & Sloan's No. 2 Dora Roberts, SW cor. SE Sec. 136, Blk. 29 — Drlg. 1,870 ft.
Peer Oil Corp.'s No. 1 Read, C NW Sec. 39, Blk. 30, T. & P. Sur., T-1-N — Hole full salt water 2,790-2,820 ft.; total depth 3,175 ft.; underreaming.
Schermerhorn Oil Co.'s No. 1 Dora Roberts — Drlg. 1,470 ft.
Sun Oil Co.'s No. 1 W. R. Settles, Sec. 135, Blk. 29 — Location.
Texon O. & L. Co. and Marland Oil Co.'s No. 1 Mrs. Connaly, NE cor. Sec. 15, Blk. 33, T. & P. Sur., T-1-S — Top salt 1,425 ft.; hole full salt water 1,760-1,800 ft.; show oil 3,065 ft.; hole full sulphur water 3,500-55 ft.; drlg. lime 3,887 ft.
Vitek Oil Co.'s No. 1 H. R. Clay — Total depth 1,779 ft.; shot with 120 qts. at 1,748-75 ft.; 1,500 ft. oil in hole.
Ward Oil Co.'s No. 1 Dora Roberts — Drlg. 550 ft.
Weekly Oil Corp. et al's No. 1 Dora Roberts, Sec. 156, Blk. 29 — Location.

HUDSPETH COUNTY

American Land Co.'s (was Lockhart Bros.') No. 1 Gardner & Moseley, C SE Sec. 5, School Blk. 21 — Shut down 262 ft.
Western States Oil Co.'s (was Lockhart & Co.'s) No. 1 Moore, C SE Sec. 16, Blk. 71, T. & P. Sur., T-6 — Shut down for casing 900 ft.
Western States Oil Co.'s No. 1 Gardner & Mosley, Sec. 12, Blk. 18 — Rig.

IRION COUNTY

Cash Dollar et al's No. 1 G. J. Bird, NE Sec. 16, Blk. 10, S. P. R. R. Sur. — Shut down 2,500 ft.
F. E. Webb et al's No. 1 J. M. Nutt — Spudded and shut down.

JEFF DAVIS COUNTY

J. K. Hughes Dev. Co.'s No. 2 Means — Shut down lime 2,050 ft.
Humble O. & R. Co.'s No. 2 Crecencio Flores, 1,130 ft. N and 850 ft. E of SW cor. Sec. 34, Blk. 58, T. & P. Sur., Twp. 8 — Total depth 2,665 ft.; reamed 8-in. to 2,601 ft. to shut off water.

JONES COUNTY

Midwest Expl. Co.'s (was Campbell et al's) No. 1 L. H. Herndon, Sec. 6, M. E. P. & P. Sur., elev. 1,832 ft. — Total depth 3,009 ft.; will shoot showings at 2,485-89 ft. and 2,558-61 ft.
Garland & Diamond's No. 1 E. D. Glynn, SE cor. Sec. 18, Deaf & Dumb Asylum Lands — Shut down 2,430 ft.
Gibson & Johnson's No. 1 R. J. Camp, S. M. Hale Sur. — Hole full water 2,108-15 ft.; underreaming 6-in. at 2,143 ft.
Hutson & Weaver's No. 1-A Smith — Total depth 1,980 ft. (corr.), shut down for casing.
Phillips Pet. Co.'s No. 2 J. C. Mason — Total depth 2,529 ft.; pay 2,520-27 ft.; swabbed 75 bbls. first 14 hrs.
W. G. Stough et al's No. 1 W. C. Bennett, Sec. 42, Orphan Asylum Sur. — Shut down 800 ft.
W. G. Stough and others' No. 1 J. P. Willis, J. C. Patterson Sur. No. 2 — Shut down 1,740 ft.
Stebbins Oil and Sinclair O. & G. Co.'s No. 1 Scott — Drlg. 3,180 ft.
Swensondale Oil Co.'s No. 1 Caton, SW NW Sec. 9, Deaf & Dumb Asylum Lands — Show oil 3,008-20 ft.; shot 80 qts., no results; drlg. 3,030 ft.

KNOX COUNTY

Deep Rock Oil Co.'s No. 1 Moore — Drlg. 640 ft.
Deep Rock Oil Co.'s No. 1 Big Four, 1,270 ft. S and 2,590 ft. W of NE cor. Sec. 31, Blk. 4 — Total depth 2,455 ft.; shut down.

LOVING COUNTY

Lockhart Bros.' No. 1 fee, Sec. 85, Blk. 33, H. & T. C. Sur. — Location.
Owens & Sloan's No. 1 W. D. Johnson, C SE Sec. 20, Blk. 53, T-2, T. & P. Sur., elev. 2,934 ft. — Shut down 1,020 ft.; in litigation

LYNN COUNTY

Elpo Oil Co.'s No. 1 Nevols, NW cor. Sec. 6, Blk. C-42, School Lands — Shut down 630 ft.

MIDLAND COUNTY

Orbit Oil Co.'s No. 1 Moreland, C SE Sec. 17, Blk. 39, T. & P. Sur., T-1-S — Shut down 185 ft.

MITCHELL COUNTY

Paul Teas et al's No. 1 A. C. Mills, NW cor. C. A. O'Keefe Sub. 11, J. P. Smith Sur. — Rig.
Robert Thraves' No. 1 C. Way, Sec. 91, Blk. 27, T. & P. Sur., T-1-N — Total depth 2,508 ft.; shut down

NOLAN COUNTY

Herbert Oil Co.'s (was McClesky and others') No. 1 Pepper, SE cor. SW Sec. 29, Blk. 22, T. & P. Sur. — Rigged up and shut down.
Winemiller Corp.'s (was Reiter-Foster Oil Co.'s) No. 1 T. E. Arledge, Sec. 217, Blk. 1, H. & T. C. Sur. — Set 12½-in. at 700 ft.
Zweifel and others' No. 1 Longbotham, C SE Sec. 130, Blk. 1, H. & G. N. Sur. — Shut down 3,575 ft.

PECOS COUNTY

George Anderson's No. 1 Sherbine Bros. — Rig.
Cummings et al's No. 1 Blackstone & Slaughter — Drlg. lime 1,700 ft.
M. C. Dibble & Hale's No. 1 Bonebrake, Sec. 115, Blk. 8, H. & G. W. Sur., elev. 2,555 ft. — Shut down 640 ft.
Douglas Oil Co.'s No. 2 John T. Sellman, Sec. 14, Blk. Z. — Location.
Garland & Mott's No. 1 El Paso Cattle Loan Co., C NE Sec. 26, Blk. 126, T. & S. L. Sur., elev. 3,267 ft. — Hole full sulphur water 2,560 ft. Total depth 3,501 ft.; plugging to abandon.
Gibson Oil Corp.'s No. 1 R. R. Russell — Rig.
George A. Henshaw et al's No. 1 B. T. Corder, C SW Sec. 74, Blk. 2, C. C. S. D. Sur. — Rig.
George A. Henshaw, Jr., No. 1 Schimmel, Sec. 29, Blk. 144, T. & St. L. Sur., elev. 2,780 ft. — Hole full sulphur water 1,275-80 ft.; drlg. lime 1,640 ft.
Kershaw & Livingston's No. 1 Cannon — Rig.
Kirby Pet. Co. and Roxana's No. 1 W. W. Turney, NW cor. SW Sec. 11, Blk. 140, T. & St. L. Sur. — Hole full sulphur water 975-81 ft.; shut down 1,189 ft.
Mid-Kansas O. & G. Co.'s No. 1 Pryor & Wilson, NW cor. Sec. 3, Blk. 5, T. C. R. R. Sur. — Moving in machine.
Moody Oil Corp.'s No. 1 B. T. Corder, C SW Sec. 77, Blk. 2, C. C. S. D. Sur. — Rig.
Olean Pet. Co.'s No. 1 G. N. Harral, C SW Sec. 82, Blk. R-3, G. C. & S. F. Sur., elev. 3,005 ft. — 1,200 ft. salt water 2,965-78 ft.; shut down 2,995 ft.
Quinby Oil Co.'s No. 1 Townsite, Sec. 1, Blk. 267, Client Addn. Sur. Fort Stockton, elev. 2,980 ft. — Shut down 3,440 ft.
Quinby Oil Co.'s No. 2 Bennet, C NW 592, Blk. 105, G. C. & S. F. Sur., elev. 2,560 ft. — Shut down 1,457 ft.
Quinby Oil Co.'s No. 1 A. A. Gary, 660 ft. N and 1,320 ft. E SW cor. Sec. 593, Abst. 3,009, elev. 2,551 ft. — Shut down 700 ft.
Red Bank Oil Co.'s No. 1 Arthur Harral — Drlg. 665 ft.
Robert Lee's No. 1 Joe Parker — Rig.
B. J. Spikes' No. 1 George Brown — Spudded and shut down.

Transcontinental Oil Co.'s No. 1 Blackston & Slaughter, Sec. 29, Blk. 129, F. St. L. Sur., elev. 3,539 ft. ..... 250 ft. sulphur water in black sand 1,150-80 ft.; small show oil 1,510 ft.; show gas 1,540 ft; show oil 2,080 ft.; drlg. black shale 2,265 ft.; hole caving badly.

World Oil Co.'s No. 1 Kloh, Sec. 47, Blk. 48, Twp. 8, T. P. R. R. Sur., elev. 2,810 ft. ..... Rigged and shut down.

World Oil Co.'s No. 1 Serf, SW cor. NE Sec. 10, Blk. 130, T. & St. L., elev. 3,245 ft. ..... Rig.

Yates Pool, Pecos County

(* denotes test in extension territory.)

*Allsman & Bell's No. 5 River Bed, 312 ft. N of No. 4.... Rig.
*Allsman & Bell's No. 11 River Bed ..... Drlg. 275 ft.
California Co.'s No. 7 Yates, Sec. 34, Blk. 194 ..... Rig standing.
California Co.'s No. 6 Yates, Sec. 34, Blk. 194 ..... Flowing 268 bbls. daily at 1,094-1,111 ft.
California Co.'s No. 8 Yates, Sec. 34, Blk. 194 ..... Drlg. 1,103 ft.
California Co.'s No. 4 Smith, Sec. 35, Blk. 194 ..... Underreaming 810 ft.
California Co.'s No. 5 Smith, Sec. 35 ..... Drlg. 662 ft.
California Co.'s No. 6 Smith, Sec. 35 ..... Rig.
California Co.'s No. 7 Smith, Sec. 35 ..... Rig.
California Co.'s No. 8 Smith ..... D gging cellar.
California Co.'s No. 9 Smith ..... Location.
*Day Bros. & McKnight's No. 1 Yates, NW cor. Sec. 58, Blk. 1 ..... Top salt 440 ft., cleaning out 745 ft.
Gulf Prod. Co.'s No. 2 Smith, Sec. 28, Blk. 194 ..... Drlg. 1,335 ft.; top pay 1,295 ft.; flowed 152 bbls. in 6 hrs.
Gulf Prod. Co.'s No. 3 Smith ..... Drlg. 410 ft.
Gulf Prod. Co.'s No. 4 Smith ..... Drlg. 300 ft.
Gulf Prod. Co.'s No. 5 Smith ..... Rigging.
*Gulf Prod. Co.'s No. 1 Yates, Runnels Co. School Land.. Drlg. 1,363 ft.
*Gulf Prod. Co.'s No. 2 Yates, Runnels Co. School Land.. 2,000,000 ft. gas 1,231-35 ft.; flow. 712 bbls. 1,258-89 ft.
Gulf Prod. Co.'s No. 5 Yates ..... Rigging.
Gulf Prod. Co.'s No. 6 Yates ..... Location.
Gulf Prod. Co.'s No. 7 Yates ..... Location.
Humble O. & R. Co.'s No. 4 Smith ..... Drlg. 750 ft.
Humble O. & R. Co.'s No. 5 Smith-A ..... Drlg. 200 ft.
*Humble O. & R. Co.'s No. 1 Smith-B, Sec. 101, Blk. 194 .. Drlg. 1,030 ft.
Humble Oil Co.'s No. 3 M. A. Smith-B, Sec. 101, Blk. 194 ..... Location.
McMann's No. 1 J. H. Tippett, Sec. 108, Blk. 194 ..... Location.
*Mazda and Savoy's No. 2 Smith, Sec. 24, Blk. 194 ..... Location.
McMan and Marland's No. 11 Yates, Sec. 34½, Blk. 194 .. Drlg. 1,100 ft.
McMan and Marland's No. 12 Yates, Sec. 34½, Blk. 194 .. Drlg. 520 ft.
McMan and Marland's No. 13 Yates ..... Rigging up.
McMan and Marland's No. 14 Yates ..... Location.
Marland Oil Co.'s No. 5 Yates-A, Sec. 60, Blk. 1 ..... Drlg. 840 ft.
Marland Oil Co.'s No. 6 Yates-A, Sec. 60, Blk. 1 ..... Drlg. 955 ft.
Marland Oil Co.'s No. 7 Yates-A, Sec. 60, Blk. 1 ..... Drlg. 998 ft.
Marland Oil Co.'s No. 8 Yates-A, Sec. 60, Blk. 1 ..... Drlg. 900 ft.
Marland Oil Co.'s No. 9 Yates-A ..... Drlg. 108 ft.
Marland Oil Co.'s No. 10 Yates-A ..... Drlg. 150 ft.
Mid-Kansas and Transcontinental's No. 8 Yates-A, Sec. 33½, Blk. 194 ..... Drlg. 450 ft.
Mid-Kansas and Transcontinental's No. 9 Yates-A, Sec. 33½, Blk. 194 (W of No. 2) ..... Flowing 150 bbls. hr. from 970-1,009 ft.
Mid-Kansas and Transcontinental's No. 10 Yates-A, Sec. 33½, Blk. 194 (N of No. 1) ..... Waiting for machine.
*Mid-Kansas and Transcontinental's No. 11 Yates-A, Sec. 33½, Blk. 194 (S of No. 1) ..... Shut down 125 ft.
Mid-Kansas and Transcontinental's No. 12 Yates-A ..... Waiting on machine.
Mid-Kansas and Transcontinental's No. 13 Yates-A ..... Rigging up; waiting on machine.
Mid-Kansas and Transcontinental's No. 14 Yates-A ..... Rigging up; waiting on machine.
Mid-Kansas and Transcontinental's No. 15 Yates-A ..... Location.
Mid-Kansas and Transcontinental's No. 7 Yates-B, Sec. 61, Blk. 1 ..... Drlg. 1,020 ft.
Mid-Kansas and Transcontinental's No. 8 Yates-B, Sec. 61, Blk. 1 ..... Top pay 998 ft.; drlg. 1,048 ft.; flowed 1,471 bbls. 10 hrs.
Mid-Kansas and Transcontinental's No. 10 Yates-B, Sec. 61, Blk. 1 ..... Clearing location
Mid-Kansas and Transcontinental's No. 11 Yates-B ..... Cellar.
*Mid-Kansas and Transcontinental's No. 12 Yates-B ..... Location.
Mid-Kansas and Transcontinental's No. 13 Yates-B ..... Shut down 180 ft.
Mid-Kansas and Transcontinental's No. 14 Yates-B ..... Drlg. 225 ft.
Mid-Kansas and Transcontinental's No. 15 Yates-B ..... Show oil 605-10 ft.; drlg. 920 ft.
Mid-Kansas and Transcontinental's No. 16 Yates-B ..... Show gas 168 ft.; drlg. 830 f...
Mid-Kansas and Transcontinental's No. 17 Yates-B ..... Clearing location.
Mid-Kansas and Transcontinental's No. 18 Yates-B ..... Clearing location.
Mid-Kansas and Transcontinental's No. 19 Yates-B ..... Wait. for machine.
Mid-Kansas and Transcontinental's No. 20 Yates-B ..... Cellar.
Mid-Kansas and Transcontinental's No. 21 Yates-B ..... Cellar.
Mid-Kansas and Transcontinental's No. 22 Yates-B ..... Cellar.
Mid-Kansas and Transcontinental's No. 4 Yates-C, Sec. 60, Blk. 1 ..... Rig.
Mid-Kansas and Transcontinental's No. 6 Yates-C ..... Waiting on machine
Mid-Kansas and Transcontinental's No. 7 Yates-C ..... Drlg. 940 ft.
Mid-Kansas and Transcontinental's No. 8 Yates-C ..... Drlg. 180 ft.
Mid-Kansas and Transcontinental's No. 9 Yates-C ..... Drlg. 210 ft.
Mid-Kansas and Transcontinental's No. 10 Yates-C .... Location.
Mid-Kansas and Transcontinental's No. 1 Yates-D, Sec. 62, Blk. 1 ..... Rig.
Mid-Kansas and Transcontinental's No. 2 Yates-D, SW part Sec. 62, Blk. 1 ..... Rig.
Mid-Kansas and Transcontinental's No. 4 Smith-Taylor, Sec. 33, Blk. 194 ..... Shut down 1,240 ft.
Mid-Kansas and Transcontinental's No. 5 Smith-Taylor Drlg. 1,080 ft.
Mid-Kansas and Transcontinental's No. 6 Smith-Taylor.. Drlg. 880 ft.
Mid-Kansas and Transcontinental's No. 7 Smith-Taylor.. Location.
Mid-Kansas and Transcontinental's No. 8 Smith-Taylor.. Location.
Mid-Kansas and Transcontinental's No. 9 Smith-Taylor.. Location.
*Hoxana Pet. Corp.'s No. 3 Tippett, Sec. 102, Blk. 194 .... Flowing 1,680 bbls. daily.
Roxana Pet. Corp.'s No. 4 Tippett ..... Drlg. 200 ft.
Roxana Pet. Corp.'s No. 5 J. H. Tippett, Sec. 102, Blk. 194 ..... Location.
Roxana Pet. Corp.'s No. 6 J. H. Tippett, Sec. 102, Blk. 194 ..... Location.
Roxana Pet. Corp.'s No. 2 Smith, SE cor. SW Sec. 27, Blk 194 ..... Shut down for water 1,125 ft.
Roxana Pet. Corp.'s No. 3 Smith ..... Rig.
Roxana Pet. Corp.'s No. 5 M. A. Smith, Sec 27, Blk. 194.. Location.
Simms Oil Co.'s No. 4 Smith, Sec. 103, Blk. 194 ..... Fishing 640 ft.
Simmons et al's No. 1 ..... Drlg. 190 ft.
Layne-Tex Oil Co.'s No. 1 ..... Pull. 12-in. 60 ft.

PRESIDIO COUNTY

Headlock & Miller's No. 1 Tootie Est., Sec. 123, Blk. 3, D. & P. Sur., elev. 2,912 ft. ..... Salt water 2,610 ft.; total depth 3,003 ft.; shut down for orders.

Pinto Canyon Oil Co.'s No. 1 Fields, 1,760 ft S and E NW cor. Sec. 74, Blk. 2, D. & P. Sur. ..... Location.

REAGAN COUNTY

Henshaw & Camp's No. 1 University, Sec. 14, Blk. 49, University Land, elev. 2,772 ft. ..... 250 ft. sulphur water at 800 ft., fish. pipe 2,080 ft.

Skelly Oil Co.'s No. 1 University, SW cor. Sec. 33, Blk. 8, University Land ..... Top salt 1,340 ft.; drilling 2,735 ft.
Texon O. & L. Co.'s No. 1-B University, Group 1 ..... Top pay 6,284 ft.; total depth 6,590 ft.; 3,800 ft. of 38.7 gravity oil in hole; shut down.

White et al's No. 1 Shofner & Sterling, SE cor. NW Sec. 10, 2 m. N of Big Lake ..... Shut down 670 ft.

REEVES COUNTY

Exploration Co.'s No. 1 A. A. Kinney, 1,500 ft. W of NE cor. Sec. 26, Blk. C-18, Public School Land, elev. 2,847 ft. ..... Show oil 1,105-10 ft.; drlg. 1,275 ft.
Grisham-Hunter Corp.'s No. 1 Rathge & Connor ..... Rig.
David R. Thompson's No. 1 A. A. Eddins ..... Drlg. 3,943 ft.
World Oil Co.'s No. 1 Biggs, C SE Sec. 65, Blk. 112, Public School Land Sur., elev. 3,068 ft. ..... Shut down 1,610 ft.
World Oil Co.'s No. 1 Duff, elev. 2,753 ft. ..... Top Delaware lime 4,185 ft.; hole full brackish salt water 4,368-4,500 ft.; plug. back to 4,250 ft. to shoot.

RUNNELS COUNTY

Empire G. & F. Co.'s No. 1 C. C. Clay ..... Drlg. 1,425 ft.
Gibson & Johnson's No. 1 Harris Est., Juliana Voske Cabrera Sur. ..... Location.

Gibson & Johnson's No. 1 H. P. Serratt, C SE NW Sec. 150, E. T. R. R. Sur. ..... Rig.
Kennedy et al's No. 1 J. E. Tally ..... Shut down 1,720 ft.
May et al's No. 1 J. M. Schneider, John Wall Sur. ..... One-half bailer salt water 1,032 ft.; fish. casing 1,056 ft.

Miles Oil Co.'s No. 1 Charles Ray, Sec. 21, T. & N. O. Sur. ..... Cellar.
Miles Oil Co.'s No. 1 L. S. Lawhon, NE cor. Sec. 68 .. Show gas 960-80 ft., shut down 2,250 ft.

Noble O. & G. Co.'s No. 1 Sims, Sec. 12, J. J. McHenry Sur. ..... Hole full sulphur water 2,710-20 ft. and hole full salt water 2,820 ft.; underreaming 6-in.; total depth 2,980 ft.

Royal Pet. Co.'s No. 1 A. C. Willingham ..... Location.
Swensondale Oil Co.'s No. 1 E. A. Werner ..... Drlg. 1,800 ft.
Owenwood Oil Corp.'s No. 1 H. B. Fowler ..... Location.
Watchorn O. & G. Co.'s No. 1 J. L. King ..... Drlg. 600 ft.

SCHLEICHER COUNTY

Beavers & Leath et al's No. 1 J. A. and W. T. Whitten, C NW Sec. 35, Blk. 11, T. O. Sur. ..... Shut down 400 ft.
Thomas Grey et al's No. 1 Ball Robinson, C NW Sec. 25, Blk. M, G. H. & S. A. Sur. ..... Sulphur water 2,125 ft.; hole full water 2,160-80 ft. and 2,935 ft.; shut down 3,024 ft.

SCURRY COUNTY

J. B. Mims et al's No. 1 J. J. Koonsman, Sec. 220, Blk. 2, H. & T. C. Sur. ..... Rig.

STERLING COUNTY

Orr et al's No. 1 Neal Reed, CNL Sec. 15, Blk. 30, W. & N. W. Sur. ..... Shut down 1,390 ft.: (corrected)

STONEWALL COUNTY

Peer Oil Corp. and Producers Oil Co.'s (was J. P. Johnson's) No. 1 R. P. Morrow ..... Hole full water 2,625-90 ft.; set 10-in. 2,700 ft.; preparing to plug at 3,038 ft.

TAYLOR COUNTY

A. J. Brown et al's No. 1 Hensiee, NE cor. Sec. 5, Blk. 4, S. P. R. R. Sur. ..... Fish. 2,265 ft.
Dorning & Perrine's No. 1 J. A. Hammer, C N 100 acres, Sec. 23, Blk. 19, T. & P. Sur., elev. 1,904 ft. ... Shut down 455 ft.
Gilbert Johnson and Day Bros.' No. 1 C. M. Brown, Sec. 1, Blk. 6, T. & P. Sur. ..... Underreaming 835 ft.
Owen & Sloan's No. 1 Lattimer, Sec. 14, Blk. 9, T. & P. Sur. ..... Shut down 2,605 ft.
Roeser & Pendleton's No. 1 Sam Hutman, C W half NW Sec. 64, Blk. 5, T. & P. Sur. ..... Water sand 2,222 ft.; running 5-in. 2,765 ft.

TERRELL COUNTY

Deep Rock Oil Co.'s No. 1 H. C. Nolke, Sec. 4, Blk. A-2, T. C. R. R. Sur. ..... Cellar.
Humble Oil Co.'s No. 1 University, Sec. 15, Blk. 34 ..... Location.
Millham Exploration Co.'s No. 1 Bassett, CNL Sec. 99, Blk. Y, W. H. Robertson Sur. ..... Drlg. 375 ft.

TERRY COUNTY

Kingsland O. & P. Co.'s No. 1 Brownsfield, C NW SW SW Sec. 7, Blk. 1-A, E. L. R. R. Sur. ..... Slight show gas 2,230 ft.; running 6-in. 3,207 ft.

TOM GREEN COUNTY

George Amery's No. 1 Wilkey, C SW Sec. 3, B. A. L. Sur. ..... Location.
Cox et al's No. 1 Llano ..... Total depth 470 ft.; shut down
Fitzgerald et al's No. 1 Bennett ..... Drilling 1,715 ft.
Marland Oil Co.'s No. 1 J. W. Johnson, C SE, Sec. 6, R. B. Sanderson Sur. ..... Hole full water 2,020-45 ft.; drlg. 2,606 ft.
Marland Oil Co.'s No. 1 J. W. Johnson-A ..... Drlg. 1,345 ft.
Tulsa Oil Co.'s No. 1 Adams, C SW Sec. 163, Blk. 11, S. P. R. R. Sur. ..... Shut down lime 1,020 ft.

UPTON COUNTY

Mark Curtis et al's (was Hultz et al's) No. 2 Giddings, 5,336 ft. S and 6,678 ft. E of NW cor. Throckmorton Co. School Land, League 1, elev. 2,757 ft ..... Shut down 630 ft.
Skelly Oil Co.'s No. 1 J. F. Lane, SW cor. SE SE Sec. 3, G. C. & S. F. Sur. ..... Top salt 569 ft.; drlg. 1,700 ft.
Southern C. O. P. Co.'s No. 1 C. W. Hobbs ..... Drlg. 2,145 ft.
The Texas Company and Cordova Union's No. 1 Union Land, Sec. 23, Blk. 35, H. & T. C. ..... Top pay 2,098 ft.; swabbed 60 bbls. in 36 hrs. at 2,271 ft., 2 per cent water; completed.
Texas Pacific C. & O. Co.'s No. 11 J. F. Lane-A lease, Sec. 5 ..... Location.
Tulsa Drlg. Co.'s No. 1 W. A. Chaney, Sec. 18, Blk. 3, M. K. T. Sur. ..... Top salt 670 ft.; show oil 2,090 ft.; total depth 2,435 ft.; plugging back to oil show.
Wise & Jackson's No 1 J. H. Porter, SW cor. SW SW Sec. 184, Blk. E, elev. 2,592 ft. ..... Top pay 3,419 ft.; total depth 3,5[illegible] ft., gray lime; shut down

VAL VERDE COUNTY

A. Blume et al's No. 1 Moore Est., Sec. 183, J. Mitchell Sur., elev. 953 ft. ..... Shut down 3,006 ft.
Curso Williams' No. 1 Holman, NE NE Sec. 5, Blk. N, G. H. & S. A. Sur. ..... Dry and abandoned 2,940 ft.
Douglas Oil Co.'s No. 1 Sellars, C SE Sec. 82, Blk. A, I. & G. N. Sur. ..... Drlg. 4,100 ft.
East Del Rio Oil Co.'s No. 1 Russell, SE cor. Sec. 183, Del Rio Town Sur., elev. 941 ft. ..... Total depth 3,190 ft.; shut down
Magnolia Pet. Co.'s No. 1 Whitehead, Sec. 81, D. G. C. & S. F. Sur., elev. 1,770 ft. ..... Drlg. 5,320 ft.
Independent Operators' No. 1 Whitehad, SE SE Sec. 30, Blk. 4, I. & G. N. Sur., elev. 1,175 ft. ..... Shut down 3,900 ft.
O. O. Owens' No. 1 Mills, Sec. 128, Blk. 1, I. & G. N. Sur., elev. 2,130 ft. ..... Gas sand 2,491-2,520 ft.; tested 125,750 ft. gas; reset 8-in. 2,511 ft.; drlg. 3,535 ft. lime.

WINKLER COUNTY

Amerada Pet. Corp.'s No. 1 J. B. Walton, SW cor. NW Sec. 48, Blk. 26, elev. 2,833 ft. ..... Top salt 1,086 ft.; 2,500,000 ft. gas 1,700-08 ft.; killed gas with 3½ tons baroid; cored brown lime carrying oil 2,334 ft.; standardized and drilling ahead.
Atlantic O. P. Co.'s No. 1 Ida Hendrick, SE cor. W half NE Sec. 44, Blk. 26 ..... Show gas 2,770 ft.; drlg. 2,870 ft.; flowing 115 bbls.
Atlantic O. P. Co.'s No. 1 Grisham-Hunter, Sec. 34, Blk. B-5 ..... Drilling 3,430 ft.
Atlantic O. P. Co.'s No. 2 Grisham-Hunter ..... Top pay 2,826 ft.; increase 2,837-43 ft.; total depth 2,890 ft.; averaged 817 bbls. daily last week.
Atlantic O. P. Co.'s (was G. M. Church et al's) No. 1 Ida Hendrick, Sec. 29, Blk. B-5 ..... Drlg. 2,635 ft.
Atlantic O. P. Co.'s No. 1 Grisham-Hunter-C (was Lemar) ..... Drlg. 2,339 ft.
Atlantic O. P. Co.'s No. 1 Ida Hendrick-D ..... Standardizing 2,559 ft.
Atlantic O. P. Co.'s No. 2 Ida Hendrick-D ..... Drlg. 325 ft.
Atlantic O. P. Co.'s No. 1 Grisham-Hunter-E ..... Drlg. 1,862 ft.
V. T. Bolin et al's No. 1 Brown ..... Spudded and shut down.
Magnolia Pet. Co.'s (was G. M. Church et al's) No. 1 Ida Hendrick, Sec. 29, Blk. B-5 ..... Flowing 30 bbls. hr. at 2,830-40 ft.
Magnolia Pet. Co.'s (was G. M. Church et al's) No. 2 Ida Hendrick ..... Drlg. 2,590 ft.
Magnolia Pet. Co.'s No. 3 Ida Hendrick ..... Drlg. 1,720 ft.
Cranfill Bros. and California Co.'s No. 1 M. J. Basham, at cor. Secs. 10, 11, 22 and 23, School Blk. 77 ..... Drilling 3,430 ft.
Cranfill & Reynold's No. 1 Grisham-Hunter-B, Sec. 35, Blk. B-5 ..... Drlg. 2,360 ft.
Eastland Oil Co. and Arnold's No. 1, Sec. 35, Blk. B-5 ... First gas 2,492 ft.; 7,000,000 ft. at 2,512 ft.; shut down 2,532 ft.
Gulf Prod. Co.'s No. 3 T. G. Hendrick ..... 250,000 ft. gas 2,623-25 ft.; drlg. 2,866 ft.; made 2 small heads oil.
Gulf Prod. Co.'s No. 5 T. G. Hendrick ..... Show oil 2,635-40 ft.; 25,000,000 ft. gas 2,779 ft.
Gulf Prod. Co.'s No. 6 T. G. Hendrick, NE cor. NW Sec. 34 ..... 4,000,000 ft. gas 2,718-20 ft.; sprayed 20 bbls.; drlg. 2,825 ft.; 8,000,000 ft. gas.
Humble O. & R. Co.'s No. 1 T. G. Hendrick, NW cor. NE Sec. 34, Blk. B-5, Public School Land, elev. 2,816 ft. ..... Total depth 2,763 ft.; fished out one bit; gas which had been killed broke loose again; rigging up rotary.

Humble O. & R. Co.'s No. 3 Hendrick, Sec. 34, Blk. B-5 .. 5,000,000 ft. gas from 2,194 ft., total depth 2,370 ft.; fishing drill stem.

Humble O. & R. Co.'s No. 1 Ida Hendrick-B ..... Flowed 3,550 bbls. from 2,936 and 2,964-68 ft.

Humble O. & R. Co.'s No. 2 Ida Hendrick-B ..... Rig on ground.

Humble O. & R. Co.'s No. 3 Ida Hendrick-B ..... Drlg. 2,865 ft.

Independent O. & G. Co.'s No. 1 J. S. Howe-D, NE cor. W half SE Sec. 44, Blk. 26 ..... Top pay 2,846 ft.; drlg. 2,951 ft.

Independent O. & G. Co.'s No. 2 Hendricks-A, elev. 2,822 ft. ..... Flowed 1,671 bbls. first 24 hrs. from total depth 2,815 ft.

Independent O. & G. Co.'s No. 1 Vardeman-B ..... Drlg. 1,240 ft.

Independent O. & G. Co.'s No. 2 Vardeman-B ..... Cellar.

Liner Drlg. Co.'s No. 1 Seth-Campbell, NE cor. Sec. 2, Blk B-5 ..... Shut down 450 ft.

Landreth Prod. Corp.'s No. 1 Hendrick-A, SE cor. SW Sec. 29, Blk. B-5 ..... Top lime 2,663 ft.; show oil 2,684 ft. and 2,875 ft.; 1,400 ft. oil 2,925 ft.; 200 ft. sulphur water 3,009-13 ft.; water exhausted; filled hole up to 2,950 ft. with gravel; making 3 bailers oil hr. Shot with 200 qts. at 2,874-2,926 ft.; 200 ft. oil rose over night; swabbed 45 bbls. and dry; to pump.

Landreth and Roxana's No. 2 Ida Hendrick-A, Sec. 29, Blk. B-5 ..... Part rigged and shut down.

Landreth and Roxana's No. 3 Ida Hendrick-A, Sec. 29, Blk. B-5 ..... Part rigged and shut down.

Landreth and Roxana's No. 4 Ida Hendrick-A ..... Drlg. 2,835 ft.; 1,000,000 ft. gas 2,790-93 ft.

Murchison Oil Co. et al's (was Marland Oil Co.'s) No. 1 Grisham-Hunter-B ..... Location.

Murchison Oil Co. et al's (was Marland Oil Co.'s) No. 2 Grisham-Hunter-B ..... Cleaning out 3,007 ft.; made 120 bbls. in 4 hrs. Nov. 30 from 2,890-2,900 ft.

Murchison Oil Co. et al's (was Marland Oil Co.'s) No. 3 Grisham-Hunter-B ..... Showing oil 2,630 ft.; total depth 2,427 ft.; tore down standard rig; standing cemented.

Murchison Oil Co. et al's (was Marland Oil Co.'s) No. 4 Grisham-Hunter-B ..... Drlg. 2,730 ft.

Mining & Engineering Co.'s No. 1 T. G. Hendrick, Sec. 10, Blk. B-12 ..... Partly rigged up and shut down.

Murchison Oil Co. and Cranfill Bros.' No. 2 Grisham-Hunter ..... Location.

Murchison Oil Co. and Cranfill Bros.' No. 4 Grisham-Hunter ..... Location.

Pure Oil Co.'s No. 2 Hendrick, elev. 2,827 ..... Top salt 1,518 ft.; top lime 2,390 ft.; made 20-bbl. head at 2,635-43 ft.; 1,200 ft. oil in hole 2,657-80 ft.; shut down 2,770 ft.; hole full oil.

Pure Oil Co.'s No. 3 Hendrick, NE cor. SW Sec. 41, Blk. B-5 ..... Cem. 8-in. 2,360 ft.; drlg. plug.

Pure Oil Co.'s No. 1 Hendrick-B, NE cor. SE Sec. 34, Blk. B-5 ..... Show gas 2,350-60 ft.; show oil 2,380 ft.; 15,000,000 ft. gas at 2,490 ft.; more gas 2,564 ft.; 40,000,000 ft. gas at 2,720 ft.; spraying little oil 2,708 ft.; total depth 2,720 ft.

Pure Oil Co.'s No. 2 Hendrick-B ..... Top lime 2,287 ft.; standardized 2,287 ft.; drlg. plug.

Pure Oil Co.'s No. 3 Hendrick-B ..... Cem. 8-in. 2,438 ft.; rigging up.

Pure Oil Co.'s No. 4 Hendrick-B ..... Location.

Republic Prod. Co.'s No. 1 Grisham-Hunter-A, NW cor. E half SW Sec. 45, School Block 26 ..... Top lime 2,440 ft.; 15,000,000 ft. gas at 2,775 ft.; drlg. 2,796 ft.

Republic Prod. Co.'s No. 1-A Grisham-Hunter-B, SW cor. E half SE Sec. 41, Blk B-5 ..... Run. 8-in. 2,288 ft.

Republic Prod. Co.'s No. 2 Grisham-Hunter-B ..... Drlg. 2,235 ft.

Roxana Pet. Corp.'s No. 1 Grisham-Hunter-A, SW cor. E half NW Sec. 45, School Blk. 26 ..... Top lime 2,428 ft.; little gas, show oil and gas 2,570 ft.; increse gas at 2,597 ft.; spraying oil 2,760-65 ft.; 65,000,000 ft. gas 2,800-01 ft.; blew tools up in hole; gas broke gauge at 59,500,000 ft.; started spraying little oil Nov. 21; to drill deeper.

Roxana Pet. Corp.'s No. 1 Grisham-Hunter-B, SW cor. S half SE Sec. 29, Blk. B-5 ..... Top lime 2,657 ft.; show oil and gas 2,830 ft.; shut down 3,002 ft.; fishing out tools; to resume drlg.

Roxana Pet. Corp.'s No. 2 Grisham-Hunter-C, SE cor. N half NW Sec. 29, Blk. B-5 ..... Rigging up rotary.

Roxana Pet. Corp.'s No. 1 Grisham-Hunter-D, SW cor. S half NE Sec. 41, Blk. B-5 ..... Drlg. 2,410 ft.

Roxana Pet. Corp.'s No. 2 Grisham-Hunter-D ..... Location.

Sheldon & Burden's No. 1 Ida Hendrick, SW cor. SE Sec. 28, Blk. B-5 (10-a. tract) ..... Top salt 1,260 ft.; drlg. 1,750 ft.; shot 150 qts. 2,950-3,025 ft.; flowed 1,800 bbls. first 17 hrs.

Southern C. O. P. Co.'s No. 4 T-67 Hendrick-C, elev. 2,810 ft. ..... Drlg. 3,017 ft.; flowing 400 bbls.

Southern C. O. P. Co.'s No. 2 Ida Hendrick T-88-B ..... Total depth 2,650 ft., cem. 6-in. in lime; stand. cem.

Southern C. O. P. Co.'s No. 1 T-89 Grisham-Hunter-A, CWL NE SW Sec. 35, Blk. B-5, elev. 2,816 ft. ..... Top salt, 1,219 ft; top lime, 2,298 ft.; 10,000,000 ft. gas 2,473-75 ft.; 3,000,000-ft. increase at 2,485 ft.; spraying oil from 2,665 ft.; shot 300 qts. 2,480-2,685 ft. to shoot bit loose; flowed 50 bbls. with 30,000,000 ft. gas.

Southern C. O. P. Co.'s No. 2 T-89 Grisham-Hunter-A, Sec. 35, Blk. B-5 ..... Top salt 1,189 ft.; drilling 2,282 ft.

Southern C. O. P. Co.'s No. 3 T-89-A Grisham-Hunter-A.. Drlg. 1,928 ft.

Southern C. O. P. Co.'s No. 4 T-89-A Grisham-Hunter-A.. Location.

Texon O. & L. Co.'s No. 1 Grisham-Hunter-A, SW cor. SE Sec. 41, Blk. B-5 ..... Total depth 2,814 ft.; flowing 645 bbls.; rigging up to deepen.

Texon O. & L. Co.'s No. 2 Grisham-Hunter-A ..... 5,000,000 ft. gas 2,260-2,300 ft.; 15,000,000 ft. gas 2,646-56 ft.; fishing tools 2,670 ft.

Texon O. & L. Co.'s No. 3 Grisham-Hunter-A, NW cor. W half SE Sec. 41, Blk. B-5 ..... Cem. 8-in. 2,140 ft.; standardizing.

Texon O. & L. Co.'s No. 1 Grisham-Hunter-B, NW cor. W half SW Sec. 45, School Blk. 26 ..... Shut down 1,150 ft. to install rotary.

Texon O. & L. Co.'s No. 2 Grisham-Hunter-B ..... Drlg. 960 ft.

White Eagle O. & R. Co.'s (was Gibson & Johnson's) No. 1 P. A. Lock, 1,320 ft. W of NE cor. Sec. 30, Blk. 74, NW of discovery well, elev. 2,830 ft. ..... Total depth 3,260 ft.; tools and bailer in hole; drlg. out cement.

Southern C. O. P. Co.'s No. 1 Ida Hendrick 3-T-67-A, C SW NW NE Sec. 4, Blk. B-12, elev. 2,784 ft. ..... Top lime 2,638 ft.; slight show oil 3,000-08 ft.; filled up 1,500 ft. sulphur water at 3,065-72 ft.; plugged back to 3,050 ft. but did not shut off water; waiting orders.

Southern C. O. P. Co.'s No. 2 Ida Hendrick 3-T-67-A .... Standing cemented 2,646 ft.; tore down rotary.

Southern C. O. P. Co.'s No. 1 T-67 Hendrick-B, NE cor. SE Sec. 34, Blk. 26 ..... Top salt 2,210 ft.; top lime 2,646 ft.; total depth 2,648 ft.; rigged tools and shut down.

Southern C. O. P. Co.'s No. 1 Hendrick 3-T-68-A, SW cor. W half NW Sec. 35, Blk. B-5 ..... Top salt 1,365 ft.; top lime 2,308 ft.; top pay 2,440 ft.; drilling 2,711 ft., makes 20 bbl. head every day; fishing tools 2,740 ft.

Southern C. O. P. Co.'s No. 2 Hendrick 3-T-68-A ..... Standardized 2,288 ft. and shut down.

Southern C. O. P. Co.'s No. 3 Hendrick 3-T-68-A ..... Cem. 8-in. 2,118 ft.

Southern C. O. P. Co.'s No. 1 T-88 Ida Hendrick-C, NW cor. Sec. 28, Blk. B-5 ..... 6,000,000 ft. gas 2,665 ft.; fishing tools 2,879 ft.

Southern C. O. P. Co.'s No. 2 T-88 Hendrick-C, Sec. 28, Blk. B-5 ..... Cem. 6-in. 2,435 ft.; standardized, drlg. plug.

Southern C. O. P. Co.'s No. 3 Ida Hendrick, T-88-C ..... Standardized 2,499 ft.

Southern C. O. P. Co.'s No. 4 Ida Hendrick, T-88-C ..... Drlg. 2,250 ft.

Southern C. O. P. Co.'s No. 5 Ida Hendrick, T-88-C ..... Drlg. 1,108 ft.

Southern C. O. P. Co.'s No. 6 Ida Hendrick, T-88-C ..... Drlg. 1,450 ft.

Southern C. O. P. Co.'s No. 7 Ida Hendrick, T-88-C ..... Drlg. 2,180 ft.

Turman & Maxwell's No. 1 Ida Hendrick ..... Shut down for tankage 2,879 ft. flows about 70 bbls. and 5,000,000 ft. gas.

Turman & Maxwell's No. 2 Ida Hendrick ..... Drlg. 2,520 ft.

Turman & Maxwell's No. 3 Ida Hendrick, E half NE Sec. 29, Blk. B-5 ..... Drlg. 1,735 ft.

Southern C. O. P. Co.'s No. 1 Ida Hendrick, T-88-G, SW SE Sec. 28, Blk. B-5 ..... Location; moved material away.

Southern C. O. P. Co.'s No. 1 Ida Hendrick, T-88-I, SE cor. E half NE Sec. 30, Blk. B-5 ..... Rigging up rotary.

Southern C. O. P. Co.'s No. 1 E. G. Hutchings, T-90, NE cor. E half SE Sec. 47, Blk. 26 ..... Derrick.

EASTERN FIELDS

(Continued from Page 40-D)

Squaw sand No. 5 on the Bannister heirs' farm. It will make a very light pumper.

On McFarlan Creek, Murphy district, Ritchie County, the South Penn Oil Co. has completed in the salt sand No. 10 on the Anna M. Wilson farm. It is a 10-bbl. pumper. On the same stream and district, the same company has now completed No. 4 on the Charles Bickerstaff farm producing 15 bbls. a day in the salt sand.

Drilled Down to the Berea Grit

In Reedy district, Roane County, the Heck Oil Co. drilled down from the gas sand to the Berea grit No. 1 on the H. W. Allen farm and gave it a shot. It produced 15 bbls. the ensuing 24 hours.

On the waters of West Fork, Twelve Pole Creek, Butler district, Wayne County, 2 miles southwest of Wayne, the Chartiers Oil Co. has completed through the Berea grit its test on the B. A. Ferguson farm. It is a light gasser in the formation named.

On the Guyandotte River, McComas district, Cabell County, the Pittsburgh & West Virginia Gas Co. has completed in the brown shale a test on the Andrew Alberts farm. It is a gasser. On Mud River, 2 miles west of Balls Gap, Grant district, the United Fuel Gas Co. has completed and shot in the Berea grit a test on the D. L. Finley farm. It is a gasser good for 200,000 feet.

Lewis County

In Courthouse district, Lewis County, E. G. Smith & Co. have completed in the Gantz sand a test on the James Whelan farm. It is a duster. In Collins Settlement district, the McCall Drilling Co. has drilled its test on the W. E. Butcher farm through the Benson sand at a total depth of 4,238 feet. It is a good gasser. In the same district, the Cumberland & Allegheny Oil Co. has a gasser in the same formation at No. 3 on the R. R. Price farm.

In Hackers Creek district, Lewis County, the Carnegie Gas Co. is due in the Big Injun sand at a test on the J. Davis farm. The same company is drilling No. 4 on the Anna L. Jackson farm. The Mud Lick Oil & Gas Co. is drilling No. 4 on the E. G. Davisson farm. H. P. McGinnis and others have a rig up on the L. D. Anderson farm.

On McFarlan Creek, Murphy district, Ritchie County, the Hope Construction & Refining Co. has drilled a second test on the N. & G. Jordan farm through the Big Injun sand. It is a duster. On Lowther Run, same district, the same company has the rig up for another test on the J. L. Hill farm. The same company has the rig completed for No. 3 on the N. G. Jordan farm.

Wood and Pleasants Counties

On Walnut Fork of Bull Creek, Walker district, Wood County, B. R. Crippen has a duster in the second Cow Run sand at a test on the B. M. Bills farm. In Jefferson district, Pleasants County, the Oliver Oil Co.'s test on the John Oliver farm is a duster in the same formation.

On Straight Fork, Burning Springs district, Wirt County, the South Penn Oil Co. is drilling down from the salt sand to the Big Injun its old No. 1 on the Pepper heirs' farm. On Jakes Run, Clay district, Monongalia County, the same company is drilling down to the lower sands No. 6 on the Simon Tennant farm.

Starting and Drilling Tests

In McElroy district, Tyler County, J. D. Foley is due in the Big Injun sand at a test on the Rebecca Singer farm. In Reedy district, Roane County, the Heck Oil Co. is due in the Berea grit at a test on the W. H. Allen farm. In Center district, Gilmer County, the Hope Natural Gas Co. has started to drill on the C. N. Snodgrass farm. In DeKalb district, the same company is building a rig on the Catherine Miller farm. In the same district, the Carnegie Natural Gas Co. is rigging up on the Lloyd Westfall farm.

In McComas district, Cabell County, the West Virginia Gas Corp, is building a rig on the Irving Morrison and Calvin Simpson farm. In Union district, Tyler County, Smith Brothers have made a location on the D. G. Smith farm. In Liberty district, Marshall County, the Manufacturers Light & Heat Co. is building a rig on the J. C. and Emma Reid farm. In Union district, Tyler County, C. M. Knowlton and others are moving rig material to a location on the P. B. Williamson farm. On Coleman Fork of Greene Creek, Harper district, Roane County, the South Penn Oil Co. has completed the rig for a test on the W. H. Coleman heirs' farm.

In Carroll district, Lincoln County, the Ray Gas Co. has started to drill on the A. B. Barrett farm. In Barboursville district, Cabell County, John Davidson has started to drill on the Lewis Wilson farm. In Washington district, Lincoln County, the Harvard Gas Co. has started to drill on the J. M. Moore farm. In Carroll district, the Cambridge Gas Co. is moving the rig to a new location on the A. F. Hoskinson farm. In Barboursville district, Cabell County, Wilson & Nowery are building a rig on the Meadows-Harris farm.

Southeast Ohio

In the SE of Section 20, Westland Township, Guernsey County, Davis Brothers Co. have completed in the Niagara lime a second test on the Paul Micha farm, good for 65 bbls. a day.

In the SW of Section 23, Washington Township, Hocking County, the Limelight Oil & Gas Co. has completed a second test on the W. S. Lane farm. It is a gasser good for 500,000 feet and 20 bbls. of oil in the Clinton sand. For the present, it will be operated as a gas well. The total depth of the well is 2,830 feet.

In the Fisher Pool, Section 7, Alexander Township, Athens County, Cook and others have completed a second test on the Sheldon Woodyard farm and it is a very light pumper in the Berea grit. In the SW of Section 6, Somerset Township, Belmont County, H. Rinehart has completed a test on the Samuel Starbuck farm. It is a duster in the Berea.

In the SE of Section 24, Jefferson Township, Noble County, Joseph Sailing & Co. have completed a test on the Alice Feldner farm. It got its production in the Germantown sand and produced 150 bbls. the first 24 hours. This is a good showing for the formation named.

Week-End Completions

In the southeast quarter of Lot 14, Cambridge Township, Guernsey County, George Jewell and others completed in the Niagara lime a test on the S. P. Lanning farm. It is not good for more than

10 bbls. a day at a total depth of 3,420 feet.

In the SE of Section 14, Rush Creek Township, Fairfield County, Ruff Stewart and others have a very light gasser in the Clinton sand at a test on the J. C. Grove farm. In the southwest quarter of Sutton Township, Meigs County, the Dailey Oil Co. has started to drill another test on the Gile Hysell farm.

In the SE of Section 51, Enoch Township, Noble County, H. H. Moseley & Co. have drilled down No. 5 on the L. W. Morland farm. This well was drilled many years ago to the Macksburg 500-foot sand and is now showing for a very light pumper in the 700-foot sand.

On McFarlan Creek, Murphy district, Ritchie County, the South Penn Oil Co. has completed in the salt sand No. 4 on the Charles Bickerstaff farm. It is a 15-bbl. pumper. On the same stream and district, the Hope Construction & Refining Co. is spudding in at another test on the Noah and Gay Jordan farm. On the same stream and district, the South Penn Oil Co. has completed and shot in the salt sand No. 8 on the Anna M. Wilson farm, good for 3 bbls. a day.

Southwest Pennsylvania

In Indiana Township, Allegheny County, midway between Dorseyville and Harmersville, the Chemical Oil & Gas Co. and others have drilled into the 30-foot sand a test on the William M. Campbell farm. By flowing and swabbing they recovered 40 bbls. the first 24 hours after shot. It will probably settle down to a 15-bbl. pumper. The owners of the well are hopeful of opening another Dorseyville Pool like that of some years ago. The location for a second test has been made on the Campbell farm.

In Perry Township, Greene County, the Moore-Tex Oil Co.'s test on the John Lemley farm is holding up at 50 bbls. a day. At Scenery Hill, West Bethlehem Township, Washington County, Benedum & Trees have gassers at Scenery Hill, Lots Nos. 15 and 41. In the same development, Roy Fletcher & Co. have a gasser on Scenery Hill, Lot No. 39. On Lot 42, Doctor Ritter and others have a gasser.

In East Finley Township, Washington County, the Manufacturers Light & Heat Co.'s second test on the J. B. Patterson farm is a gasser. In Washington Township, the Wasco Fuel Co. has a very light pumper at a test on the Ross D. Leonard farm.

In Richhill Township, Greene County, the Manufacturers Light & Heat Co.'s test on the B. L. and Dora M. Fry farm is dry and abandoned. In Franklin Township, the same company's test on the A. H. Seales farm is a gasser in the Bayard sand.

SOME ADVANTAGES OF STANDARDIZED RIGS

(Continued from Page 92)

clear as to their meaning. They are, however, essential in the operations of this particular industry where the extensiveness of operation and the intensive ramifications require the best we can get for the money. In the end, these terms all tend to mean standardization in its broader interpretation, and that is what these committees of the A.P.I. have been working for five years to bring to the industry by the way of standardization, equipment of a greater efficiency that can be had for a lesser cost.

Advantages can be had only with possession, possession both of knowledge and product, so that we urge the operator, executive, engineer, superintendent, purchasing agent and foreman to put to use the A.P.I. standard specifications which have been worked out by representative members of the industry for the benefit of the industry.

VALUE OF GAS IN PETROLEUM PRODUCTION

(Continued from Page 98)

the fluid column in the well so that more efficient flow may be maintained.

In practice the well is tubed, and compressed air or natural gas is flowed into the well either through the tubing, with the petroleum flowing out through the casing, or through the casing with the petroleum flowing out through the tubing. This method is commonly practiced during the late flow period of the well.

It is found that when air-gas lift control methods are properly and efficiently used the following claims have been made for them:

1. Decrease gas-oil ratio.
2. Retard decline of production.
3. Retard water encroachment.

Data are incomplete to prove definitely but do strongly indicate the extent of value of air-gas lift on control of factors mentioned under these claims.

(d) Stopcocking method.

Stopcocking is a method of alternately closing and opening a producing well at such intervals as to permit enough petroleum to accumulate at the bottom of the tubing to maintain an intermittent flow and to prevent the gas pressure from accumulating sufficiently in the well to reduce the flow of petroleum from the reservoir into the well. This method has its greatest application to small wells where gas pressure is sufficient to flow the petroleum by a piston effect rather than by levitation.

Claims Made for Method

The following claims are found to be made for the stop-cock method of controlling production:

1. Decrease gas-oil ratio in small wells.
2. Decrease rate of petroleum production decline.

Data on the application of this method to comparatively small wells indicate a decrease in gas-oil ratio of 20 per cent to 40 per cent. This method has not been generally adopted primarily because of mechanical difficulties in the automatic control of devices that is essential to the operation of the method.

(e) Pressure maintenance method.

Pressure maintenance means the sustaining of reservoir fluid pressure at the most efficient and economic point during the producing life of a field, lease or individual well by the injection of gas into the reservoir through key wells. This method presents a problem of balancing the engineering and economic factors, and should receive ample support to assure its early and successful development. This method while only partially developed at present gives promise of becoming a real factor in the more efficient and economic production of petroleum.

Claims similar to those stated for the other methods are given for the pressure maintenance method.

Some data are reported, together with opinions, which show that these control methods have failed in many cases; however, attention should be directed to the possibility of these failures being attributable to the misapplication rather than to the principle of the methods. It should be emphasized that to apply properly any one of these methods a working knowledge of it, together with the flow conditions which are to be controlled, is necessary.

B. Restoration of the depleted natural fluidity and energy in the petroleum reservoir.

The injection of gas into key pressure wells to restore the depleted natural fluidity and energy of the petroleum in an old pool to recover a greater ultimate production is found to be an economical method and supports the conclusions that natural gas is important in the production of petroleum. To date most restoration projects have been mainly used to restore the depleted energy necessary to move "dead" petroleum through the formation to a producing well.

Table 1

No. Tests Made	Gas-Oil Ratio Before Test	Gas-Oil Ratio After Test	Oil Production Before Test	Oil Production After Test
2	365	243	*...	*...
1	1000	820	603	490
1	1120	620	716	400
1	10670	7900	15	15
1	8200	5900	10	30
1	810	600	4300	3500

*Not reported.

NO IMPROVEMENT IN OKLAHOMA MARKET

(Continued from Page 28)

crude production, by the rapidly increasing production of West Texas crudes. Over the last week, this has increased 17,000 bbls. and that field is now producing 60 per cent as much oil as the Seminole Field. Not all of this is new production however, but at least 75 per cent of it has been brought in over the year in spite of the low crude oil prices and prorations. With the first week of December about over and the outlook for higher prices over the balance of the month not promising, 1927 is almost sure to end with the lowest refined oil prices for many years.

Future Plans

This condition is realized by refiners and attention now is turned toward the possibilities for better prices next year. The railroads have delayed formulating contracts for their fuel requirements over the year and bids on the Government's marine requirements have been unusually low, indicating a lack of confidence in fuel prices. During the week one railroad purchased considerable heavy fuel on the spot market at 75 cents which was the top for that grade. This gave the spot fuel market strength but through its purchase the road is accumulating still greater stocks of cheap fuel to fortify its position, when it does come into the market for contract material. On the other hand, the majority of the railroads do not have sufficient storage facilities to give them more than a comfortable operating margin.

Gasolines and Naphthas

U. S. Motor gasoline generally sold at 6 to 6⅛ cents but there was some material sold at 5⅞ cents by refiners previously quoting 6 cents. There was also discussion of 5¾-cent U. S. Motor gasoline being offered but this could not be located. It is known that some gasoline is moving into Ohio and Chicago for instance at prices under 6 cents but this material is being supplied under contract and could not be taken as the index of the spot market in general.

The low endpoint gasolines showed much better stability in price and this is principally due to the shipments of 375 and 390 endpoint gasolines being made over the month to the Atlantic Refining Co. The total of these deliveries will amount to about 3,000,000 gallons on contracts already placed in Oklahoma and North Texas. In addition to these export deliveries a purchase of a large amount of 375 and 390 endpoint gasoline was made by the Sinclair Refining Co.

The price paid for the 60-62 375 endpoint grade was said to be 6¾ cents North Texas and 6½ cents for the 60-62 390 endpoint material, also based on North Texas.

Although the Oklahoma prices when figured back are below the general market for these grades, the removal of the material strengthened the market on the remaining material rather than serving to drive the general price down.

Naphthas developed additional weakness as only a little material was moved. Blenders are using regular U. S. Motor gasoline with their natural gasoline, selling a high gravity U. S. Motor grade in competition with the regular refinery grades. The small difference in price between naphtha and 56-58 U. S. Motor gasoline has been so little over the last few months it seems logical for this change in blending stock to come about but with a further decline in the market the naphtha might again become more popular.

Kerosene and Distillates

The 41-43 grade of kerosene was weaker and sold at one-eighth cent below last week's quotation. Some material was moved at 4¼ cents but the general trading was done at prices ranging from 4⅜ cents to 4½ cents. News of export inquiries lent confidence to the immediate future for this market but there was no actual buying to support this. The 42-44 grade held firm at 4¾ cents but there was only the normal domestic demand to support this price.

The light furnace oils continued to move at a fair rate but the general movement of distillates has been disappointing. This is the direct result of the mild weather prevailing throughout the northern states in the Group 3 market territory.

Natural Gasoline

This market took additional declines and there was plenty of material being offered to remove any thought of stabilizing prices even at the present low levels. Grade A was scarce in quantity at 5½ cents but there was not sufficient demand to even hold it at last week's quotations. The large production of the cheaper grades has forced manufacturers on to the market offering concessions to brokers and refiners direct, but even with these, the material is moving slowly. There was no material moved for export.

Gas Oil and Fuel Oils

The continued weakness in the gasoline market has led to the weakness in gas oil. Refiners who refused to sell their production at the market price in the past, holding it at its value as cracking stock, now choose to decrease their stocks at least for the time being. The regular 32-34 gravity gas oil could be purchased readily at 2¼ cents while the straw-colored, low cold-test gas oils sold at one-fourth to one-half cent higher.

The heavier fuels sold at prices ranging from 70 to 75 cents, in general and this applies to sales made on material as high as 22 gravity. As in the past, the low cold test fuels commanded a premium of 2½ to 5 cents but there was plenty material available. If gas oil continues to weaken, a further weakening of the high gravity fuels might be expected.

Lubricants and Wax

There was practically no change in the general lubricant market, but added weakness was shown in bright stocks. Those refiners offering materials at the higher quotations were delivering it above the required specifications. That which just met the viscosity and color specifications was posted as low as 24 cents. This applies to the 150-160 viscosity, D bright stock. Steam refined stocks were moving at a normal rate but there was plenty material being offered.

The lower prices posted on wax in the East together with the little demand caused prices here to ease off one-eighth cent, the low of the market being 2½ cents. Domestic buyer have been active in the market at these prices earlier in the year and this buying is expected to be resumed over the next few weeks.

ROCKY MOUNTAIN AREA

(Continued from Page 124)

from the National Oil Co.'s Harte well, formerly known as the Radigan-Hungerford well.

ROCKY MOUNTAIN PRODUCTION
Runs from the Fields

Wyoming	
Salt Creek	41,250
Teapot	.....
Big Muddy	2,800
Grass Creek	2,550
Elk Basin	1,060
Greybull	20
Dutton Creek	.....
Notches	.....
Rock River	2,580
Rex Lake	.....
Lance Creek	1,050
LaBarge	620
Mule Creek	630
Poison Spider	350
Hamilton	610
Osage	320
Lander	810
Pilot Butte	.....
Ferris	50
Byron	60
Lost Soldier	2,670
Simpson Ridge	40
Total Wyoming	57,470
Montana	
Cat Creek	1,880
Lake Basin	150
Kevin-Sunburst	11,000
Total Montana	13,030
Colorado	
Florence	767
Moffat	1,270
Fort Collins	2,868
Walden	.....
Iles Dome	950
Rangely	100
Tow Creek	456
Boulder	25
Total Colorado	6,436
New Mexico	
Rattlesnake	476
Hogback	620
Cap Rock	101
Table Mesa	118
Artesia	1,267
Total New Mexico	2,582
Total Rocky Mountains	79,518

REFINING AND MARKETING

Lincoln Wins Over Nebraska Standard In Gasoline Case

By Charles E. Kern

WASHINGTON, D. C., Dec. 5.—The Supreme Court of the United States today decided in favor of the city of Lincoln, Neb., in its operation of a municipally owned and operated filling station in competition with its citizens. The case was brought about by the action of the Standard Oil Co. of Nebraska in which they contended the city had no right to appropriate money derived from taxes for the purchase of equipment and the operation of a business in competition with its citizens. The case was decided against the Standard Oil Co. in the state supreme court and was then appealed.

The plaintiff in error contended that under the Fourteenth Amendment of the Constitution of the United States, taxes can be levied and public money expended only for public purposes and that the nature of a purpose, whether public or private, is a judicial question. It was contended that to engage in competition with its own citizens in supplying commodities in general use which can readily be obtained by the citizens in ample quantity and at a reasonable price from private dealers is not within the purpose for which the Government of the United States is instituted and maintained. In the case of an emergency a state might assume the responsibility for engaging in such a distribution of a necessity, but in the case cited no such emergency could be shown.

The defendant in error contended that the establishment and operation of a public market for the sale of gasoline and oil by the municipality to its inhabitants at cost, where the market, in its entirety, is owned by the public, is a public use, sufficient in law to sustain legislation providing for its establishment and operation.

FUEL OIL MARKET IN CHILE WITH IMPORT TAX

WASHINGTON, D. C., Dec. 3.—The Chilean Government has proposed a tax on the importation of fuels beginning with three pesos per ton during the first year, doubling the amount during the second year and continuing to increase until in the seventh year when a permanent tax of 21 pesos per ton is to be established. The Department of State has taken up informal conversation with the Chilean Government regarding the tax. The value of the peso is about 12.20 cents American money.

As it happens the American copper companies in Chile which make a large use of petroleum which they obtain from California, have objected to this proposal, as it will necessitate a change in their machinery in order to convert it for the use of Chilean coal. At present they are equipped to use fuel oil. In addition to this objection these copper companies represent the delivery of coal to their mines will be much more hazardous and expensive than the delivery of oil.

VETERAN DIES

CHICAGO, Dec. 3.—John W. Widner, a veteran oil man in the employ of the Standard Oil Co. of Indiana for 40 years, died last week. Mr. Widner was in the lubricating department and was widely known to buyers of lubricating oils and greases.

NAVY ASKS BIDS

WASHINGTON, D. C., Dec. 2.—The Navy Department has invited bids for all royalty casing head gasoline produced from the Naval Petroleum Reserve No. 1 at Elk Hills, Calif., from January 1 to June 30, 1928, these bids to be opened December 15 at the office of the inspector of the Naval Petroleum Reserve at Los Angeles. This royalty gasoline for the Navy has been sold by the Pan American Petroleum Co. since August 26, which was the termination of the receivership. Now to ascertain if a better price can be had for it the Navy Department decided to call for bids.

REFINERS OFFERING ANTIKNOCK GASOLINE

CHICAGO, Dec. 3.—Many refiners are now adding to their lines of gasoline a grade in the antiknock class, or as some of them prefer to call them "super gasolines," the list is being increased so rapidly that it is difficult to keep track of them all. Within a few days there have been offered to the trade in this city three new grades by large refiners for which not only good antiknock qualities are claimed but superior performance in other ways, such as quick starting, rapid acceleration, extra mileage and all the essentials of a high-grade motor fuel.

The Shaffer Oil & Refining Co. is putting out a new grade under their "Kant-Knock" brand that is stated to be a 64-66 gravity with an endpoint of 350 to 360 degrees and a benzol equivalent of 55 percentage. The gasoline is colored pink. It is being sold in tank car lots at 1 cent above the market price for the 64-66-375 gravity or at the present at 8 cents per gallon f.o.b. Group 3.

The Barnsdall Refineries, Inc., have in their "Super Gasoline" a new grade refined at the Okmulgee plant by the Cross stills and colored red that is being sold in car lots 1 cent above the price of U. S. Motor gasoline and the station price is to be 3 cents above the normal price to the motorist. The specifications have not been given out but the claim is made that it is a very superior motor fuel and all dealers purchasing the new product will be required to sell it under the name of "Barnsdall Super Gasoline."

The "Kool Motor" gasoline of the Empire Oil & Refining Co. has a peculiar green color which the company claims is only to be duplicated by the use of the identically same coloring ingredient as is used in the original. This gasoline is a 60-62-400 endpoint product with an unsaturated content. The price in tank car lots is one cent higher than the refinery price for U. S. Motor gasoline and the price at the stations is 3 cents above the regular price for the U. S. Motor grade when sold by the Cities Service Oil Co., the distributing subsidiary.

OPENS DALLAS OFFICE

CHICAGO, Dec. 5.— Arrangements have been completed by the Atlas Petroleum Co. to open an office at Dallas, Tex. The name of the manager and the location of the office will be announced this week. J. J. Taxman, chairman of the board, is in Dallas completing the final arrangements. It will be both a purchasing and sales office.

RUSSIAN OIL DEAL

The Russian Oil Trust has just announced it has closed an agreement with Czecho-Slovakian refiners for the delivery of approximately 735,000 bbls. of crude oil to them during the year beginning September 30, 1928.

DISCUSS EMULSIONS AT CRACKING SUIT HEARING

ST. LOUIS, Mo., Dec. 3.—The taking of depositions in the suit of the Universal Oil Products Co. against the Standard Oil Co. of Indiana continued here during the past week. Additional testimony will be taken during the coming week.

Dr. Gustav Egloff of the research department of the plaintiff company has been on the stand for several days. His testimony has been confined to questions relative to the nature of oil emulsions. Over 400 pages of testimony have been given by Doctor Egloff. The testimony is concerned with the theories of emulsion and their breaking including those formed in oil field production. This discussion has developed as one phase of the suit which is based on the alleged infringement of the plaintiff's patents by the defendant company in the operation of the Burton cracking process at its refineries.

Additional testimony will be given by Doctor Egloff during the coming week.

LAUNCH NEW TANKER

CHICAGO, Dec. 3.—The new addition to the fleet of tank ships operated on the Great Lakes by the Standard Oil Co. of Indiana has been launched at the shipyards of the American Shipbuilding Co., Lorain, Ohio. Directors of the Standard company, their wives and invited guests attended the launching. The name of the new tanker is the "Robert W. Stewart." It has a capacity for 40,000 bbls. of oil and cost $1,000,000. Following the launching, the party was taken to Cleveland by special train where they were guests at a banquet tendered by the American Shipbuilding Co. The tanker will go into commission in the spring.

POSTPONE GASOLINE TAX

WASHINGTON, D. C., Dec. 5.—The law providing for an increase in the Panaman import duty on gasoline from 5 to 20 cents per gallon, with a reduction in duty to 5 cents per gallon on gasoline imported by a licensee for mixing with alcohol in the preparation of a motor fuel, has been postponed by presidential decree to January 1, according to a cablegram received in the Department of Commerce from the American Trade Commission at Panama City.

The reason for this postponement was reported because the practicability of a gasoline-alcohol mixture, to be produced domestically as a gasoline substitute, has not yet been proved.

MICHIGAN GASOLINE TAX LEGAL

CHICAGO, Dec. 3.—On December 1 the Michigan Supreme Court rendered a decision holding the gasoline tax of 3 cents a gallon to be legal. This tax was passed by the legislature at its last session and was attacked by the Detroit Motor Club. It is estimated the tax will yield an annual return to the state of between $17,000,000 and $20,000,000.

TARBOX TO HAVE CHARGE

Howard Greene, head of the manufacturing department for the National Petroleum Association has been relieved of these duties temporarily because of illness according to a bulletin issued by E. M. Lyons, president. This work is now being done by P. S. Tarbox, formerly in charge of the department of economics, accounting and statistics. T. J. Hilliard has been placed in charge of latter departments now. Mr. Tarbox is manager of the Independent Refining Co. at Oil City, Pa. Mr. Hilliard is president of the Waverly Oil Works, Pittsburgh.

ANNOUNCE PLANS FOR A.I.M.M.E. MEETING

Preparations are now under way for the meeting of the refinery division of the American Institute of Mining and Metallurgical Engineers which holds its annual meeting in New York February 21, 22 and 23. This meeting is recent years has become one of the outstanding technical sessions of interest to those connected with the operation of refineries. The program this year will be of special interest to plant operators as many of the new developments in petroleum refining will be discussed in one or more prepared papers.

Walter Miller, vice president in charge of manufacturing for the Marland Refining Co., is in charge of the program as vice chairman of the refinery division. He is being assisted in the preparation of the program by Dr. T. G. Delbridge, Atlantic Refining Co.; Herschel G. Smith, Gulf Refining Co., and C. W. Stratford, Tide Water Oil Co.

One of the outstanding papers of the meeting will be that presented by Frank A. Howard and R. T. Haslam of the Standard Oil Development Co. on the "Sources of Automotive Fuel." J. E. Hays of the Mid-Continent Petroleum Corp., Tulsa, and Mr. Stratford will also present papers on phases of refinery operation. F. Julius Fohs, a widely-known geologist, will present a paper on crude oil production.

The committee in charge expects to announce the complete program within two or three weeks.

HUMBLE TO BUILD NEW REFINERY AT INGLESIDE

The Humble Oil & Refining Co. will build a refinery at Ingleside, Tex., according to an announcement made by Humble officials this week during the American Petroleum Institute meeting at Chicago. The refinery will have an initial capacity of 8,000 bbls. daily.

Ingleside is on the Texas Gulf near Corpus Christi. It is the southern terminus of the Humble Pipe Line Co.'s line connecting to the West Texas fields. It is understood that the new refinery will be specially constructed to handle the West Texas crudes which are low in gravity with sulphur compounds and other impurities which necessitate special equipment in refinery processing.

The Ingleside refinery is the second refinery project to be gotten under way by the Humble company this year. The company is now building a refinery at San Antonio. The company's only operating refinery at this time is at Baytown, Tex. This plant has a capacity of approximately 50,000 bbls. daily being one of the largest of the Texas Gulf Coast. The company's refinery at Burkburnett, Tex., was recently shut down.

PAN AMERICAN GASOLINE

LOS ANGELES, Calif., Dec. 3.—The Pan American Petroleum Corp. yesterday announced a new "super gasoline" which its advertisements state is made by a new process at its refineries. The gasoline does not contain any chemical.

The gasoline for identification has been colored green. It is claimed that it is exceptionally high in antiknock value and also very volatile. The gasoline is selling at the regular filling station price.

Brief Items for Plant Operators

STUDY HIGH BOILING AND NONVOLATILE COMPOUNDS

Although the study of the high-boiling compounds and the nonvolatile compounds present in crude petroleum has been almost neglected, it is one of the most interesting problems of petroleum chemistry, states H. M. Smith, assistant petroleum chemist, in Serial 2,837, recently published by the United States Bureau of Mines, Department of Commerce. These compounds fall into two main groups; those that are liquid at room temperature, including the hydrocarbons that make up lubricating oil, and those that are solid, such as the waxes and asphalts.

These less volatile portions, when used commercially, are evaluated through determinations of certain physical properties such as viscosity, specific gravity, boiling and melting points, but the relations that these properties bear to the chemical constitution of the oils are virtually unknown. Realizing this, the Bureau of Mines is making a study of that portion of crude oil which has a boiling point of 300 degrees Centigrade or above, and which is liquid at zero Centigrade. While these limits are quite arbitrary, they include practically all the material used in the manufacture of lubricating oils which is obtained from petroleum.

The results obtained from studying the lubricants from a so-called typical intermediate base crude are summarized in Serial 2,837. A full report of this investigation will shortly be published by the Bureau as a technical paper.

Crude oil from the Salt Creek, Wyoming, field, was selected as a source. Salt Creek crude is typical of the oil produced, not only in a large part of the Rocky Mountain district, but also in a large part of the Mid-Continent region.

Crude Oil Grouping

The present investigation consists of two parts: the separation of the crude into three main fractions—gasoline, less volatile liquids, and solids—and a detailed study of the less volatile liquid fractions. If the evidence of the literature can be trusted—that viscosity and specific gravity are functions of the composition and constitution of the oil—then the soluble Salt Creek fractions are members of the same so-called "saturated" group of hydrocarbons to which Pennsylvania lubricants belong, as typified by the lubricant fractions of Cabin Creek petroleum.

If, for the unsaturated oils, as in the case of the "saturated" group of oils, viscosity and specific gravity can be construed to indicate difference and similarity in constitution, then the Sour Lake and Salt Creek oils have portions in their lubricating stock which may be classed in the same group with each other.

The data given by the tabulation of these properties show that there are present in the lubricating stock of Salt Creek petroleum two distinct groups of oils; one relatively insoluble in acetone, having low viscosity-gravity ratios, low carbon-hydrogen ratios, and relatively low unsaturation; the other group showing, in contrast, good solubility in acetone, high viscosity-gravity and carbon-hydrogen ratios, and considerable apparent unsaturation.

The less soluble oils present in lubricants from Salt Creek crude have been shown to be of the same class as lubricants from Cabin Creek petroleum, which consist largely of the low carbon-hydrogen ratio type of oil. The extracted or more soluble portions of Salt Creek lubricating stock is very similar to the lubricating portion of Sour Lake crude oil.

Copies of Serial 2,837 may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D. C.

Investigate Yields Of Oils From Coal Lignite and Shale

An investigation on the yields and properties of oils produced from oil shale, lignite and subbituminous coal has been conducted by the United States Bureau of Mines, Department of Commerce, in co-operation with the State of Colorado. The purpose of this work, which is part of the general study of oil shales being conducted by the Bureau of Mines and co-operating agencies, was to obtain information on the amount and character of the yield of crude oil or tar from different typical oil shales, the yield of light oil or naphtha that might be suitable for use in motor fuels, and other products of shale oil. As the west has large resources both of oil shale and low-grade noncoking oils, it is of interest to know the relative yields of tars, light oils and combustible gases that can be produced from these coals when retorted under conditions similar to those suited for oil-shale retorting. The standard assay method developed by the Bureau of Mines for oil shale testing was used in the investigation.

The coal samples were obtained from deposits on or adjacent to the public lands in the states of Colorado, Montana, North Dakota, New Mexico, South Dakota and Wyoming. Many of the mines sampled are operating under government leases or permits. Of these samples, 14 were lignite coal, 16 subbituminous coal, and 2 bituminous coal. The oil shales were from Colorado, Utah, Kentucky, Nevada, Scotland, Brazil and Australia.

The average crude oil or tar yield of the 14 lignites analyzed is 5.0 gallons per ton, and of the 16 subbituminous coals, 12.9 gallons. The average scrubber naphtha yield of all of the samples is 1.4 gallons per ton.

The crude oils or tars produced from the coals in the assay retort had an average specific gravity of 1.009, and were difficult to separate from the water produced with them. In comparison with shale oils and petroleum, these coal tars are heavy, but in comparison with the tars produced by high temperature carbonization of coals, the tars are light.

The crude oils from the shales had an average specific gravity of 0.907 and could be separated fairly easily from the water produced with them. The coal tars when distilled to 275 degrees Centigrade, produced about 45 per cent of light oils, part of which could be used as motor fuel. These light oils contained a high percentage of compounds (average 65 per cent) absorbed by sulphuric acid. About 60 per cent of these compounds absorbed by sulphuric acid (40 per cent of the light oils) were tar acids. This high percentage is due probably to the conditions under which the coals were retorted. The distillates from the shale oils contained about 40 per cent of constituents soluble in sulphuric acid. These distillates to 275 degrees Centigrade averaged 17.3 gallons per ton of shale.

The residue of the coal tar remaining in the still after distilling off the light oils was a pitch, too thick and heavy to use as a fuel oil. The residue of the coal remaining in the retort after carbonization was not a coke but could probably be classified as a char.

NEW COMPRESSION PLANT

Forrest E. Gilmore & Co. have started the operation of their new 15,000-gallon gasoline plant in the Seminole Field. The exact location is in SE, Section 35-8-6 in the Little River Pool. The plant contains eight 165-horsepower engines and operates as a compression type. This plant is run in conjunction with the company's three plants at Bowlegs, the stabilizing, storing and loading for all plants being at their No. 7 Bowlegs plant.

AMONG THE TECHNICAL MEN

Forrest E. Gilmore, vice president of the company bearing his name, has had a wide experience in the natural gasoline industry over the past 10 years. In 1916, he graduated from Kansas State Agricultural College as a civil engineer and his first connection with the oil industry was as inspector and draftsman for Cosden & Co., at Tulsa, Okla. In 1918, he joined the aviation branch of the United States military service.

Forrest E. Gilmore

In January, 1919, he became engineer for the Frank P. Peterson & Co., but six months later entered into a partnership with Dean E. Foster and purchased the Frank P. Peterson & Co. The new organization was known as Foster & Gilmore and this partnership operated as consulting engineers for two years when the interests of Mr. Foster were purchased by Mr. Gilmore and the new company was incorporated as Forrest E. Gilmore & Co. The principal work of this company was the building and operation of natural gasoline plants. Seventeen plants were built in the three years that followed, most of these being in Texas.

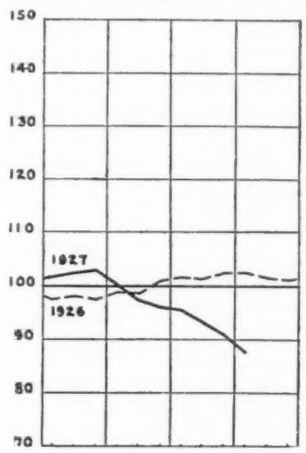
In 1924, Mr. Gilmore operated in California. His organization built several plants in California, for other companies and during this time several new features were worked out by Mr. Gilmore.

Early in 1926, the Forrest E. Gilmore Co. of Delaware purchased the California Company, and Mr. Gilmore returned to the Mid-Continent. As vice president of that company he has directed the installation and operation of nine gasoline plants in the Mid-Continent the total capacity of which is now 55,000 gallons. Mr. Gilmore resides in Tulsa.

DOWNWARD TREND IN REFINERY EMPLOYMENT

The downward trend in employment at petroleum refineries continued during the month of October according to the latest report of the Bureau of Labor Statistics of the United States Department of Labor. This trend, as shown in the accompanying chart, has been under way since March. It is explained as a development of low prices for refined products which has forced many refiners to curtail new construction work and reduce their operating force to a minimum.

Based on reports from 59 refineries the government figures show that there were

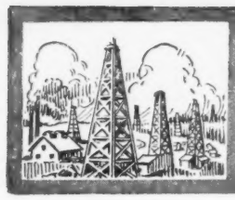


45,452 persons on the pay roll in October, a decrease of 3.5 per cent under the 47,102 in September. Compared to October, 1926, the October figure for this year represents a decrease of 14.4 per cent in the number on the payrolls of refineries and 13.1 per cent in the amount of the pay rolls. This difference in the number and amount of pay rolls reflects a situation in which the per capita earnings in petroleum refining during October were 1.4 per cent greater than in September, 1927, and 1.3 per cent greater than in October, 1926.

The government reports show that compared with October, 1926, which was 102.7 per cent, the percentage employed in August this year was 93.5 per cent, September 91.1 per cent and October 87.9 per cent. The pay roll totals was 99.7 per cent October, 1926, 91.5 per cent in August, 1927, 88.5 per cent in September, 1927, and October 86.6 per cent.

SUNBURST REFINERY PLANS

GREAT FALLS, Mont., Dec. 3.—The California Petroleum Corp. is planning to spend $200,000 for the installation of new equipment at its Sunburst, Mont., refinery which the California company purchased from the O'Neil brothers. The principal feature of the installation will be the replacement of present stills with a series of Foster tube stills, making the Sunburst plant conform with the other refineries owned by the California Petroleum Corp. in California. The capacity of the plant will not be increased from the present figure of 17,000 bbls. a day. The work is to be completed and the refinery ready for operation by January 15.



REFINERY AND CRUDE PRICES

Quotations on Principal Refined Products and Crude Petroleum Markets in All the American Oil Fields

GASOLINE AND NAPHTHA

	Dec. 6		Nov. 29		Nov. 22	
OKLAHOMA (Group 3)—						
50-52 450 endpoint	.05¾		.05¾		.05¾	.06
56-58 450 endpoint	.05¾		.05¾		.05¾	
58-60 450 endpoint	.05¾		.05¾		.05¾	
58-60 437 endpoint (U. S. Motor)	.06	.06⅛	.06	.06⅛	.06	.06¼
60-62 400 endpoint	.06½		.06½	.06⅝	.06½	.06⅝
64-66 375 endpoint	.06¾		.06¾	.07	.06¾	.07
68-70 360 endpoint	.07⅛	.07¼	.07⅛	.07¼	.07⅛	.07¼
64-66 437 endpoint (blend)	.06	.06¼	.06	.06¼	.06	.06¼
KANSAS—						
58-60 437 endpoint (U. S. Motor)	.06¼	.06⅜	.06¼	.06⅜	.06¼	.06⅜
NORTH TEXAS—						
56-58 450 endpoint	.05¾		.05¾		.05¾	
58-60 450 endpoint	.05¾		.05¾	.05⅞	.05¾	.05⅞
58-60 437 endpoint (U. S. Motor)	.06	.06⅛	.06	.06⅛	.06	.06⅛
60-62 400 endpoint	.06½		.06½		.06½	
64-66 390 endpoint	.06⅝		.06⅝		.06⅝	
64-66 375 endpoint	.06¾	.07	.06¾	.07	.06¾	.07
68-70 360 endpoint	.07		.07		.07	
64-66 437 endpoint (blend)	.06¼		.06¼		.06¼	
NORTH LOUISIANA—						
58-60 437 endpoint (U. S. Motor)	.06½		.06½		.06½	
ARKANSAS—						
58-60 437 endpoint (U. S. Motor)	.06½		.06½		.06½	
PENNSYLVANIA—						
52-54 Naphtha	.07¾	.08	.07¾	.08	.07¾	.07½
54-56 Naphtha	.07¾	.08	.07¾	.08	.07¾	.08
58-60 Gasoline	.08	.08¼	.08	.08¼	.07¾	.08
60 Gasoline	.08¾	.09	.08¾	.09	.08¼	.08½
62 Gasoline	.09⅛	.09¼	.09⅛	.09¼	.09⅛	.09¼
64 Gasoline	.09¼	.09½	.09¼	.09½	.09¼	.09½
CALIFORNIA—						
58-60 437 endpoint (U. S. Motor) domestic	.08½	.09	.08	.08½	.08	.08½
CHICAGO DISTRICT (Based on Group 3)—						
50-52 450 endpoint (Naphtha)	.05¾	.05⅞	.05⅞	.06	.06	
56-58 450 endpoint	.05¾		.05⅞		.05⅞	.06
58-60 437 endpoint (U. S. Motor)	.06	.06¼	.06	.06⅛	.06	.06¼
60-62 400 endpoint	.06½	.06⅝	.06¼	.06⅝	.06½	.06⅝
64-66 375 endpoint	.06⅞	.07	.06⅞	.07	.07	.07⅛
68-70 360 endpoint	.07¼	.07⅜	.07¼	.07⅜	.07¼	.07⅜
64-66 437 endpoint (blend)	.06⅛	.06¼	.06⅛	.06¼	.06¼	

NATURAL GASOLINE

	Dec. 6		Nov. 29		Nov. 22	
OKLAHOMA (Group 3)—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.05½	.05⅝	.05¾		.05¾	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.05⅝	.05½	.05½		.05½	.05⅝
Grade B, 76-83.9, 375 e.p., rec. 85%	.04¾	.05	.05¼		.05¼	
Grade BB, 84-92, 375 e.p., rec. 85%	.04¾		.05¼		.05⅛	.05¼
Grade C, 80-92, 375 e.p., rec. 78%	.04½		.05		.05	
NORTH TEXAS—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.05½		.05¾		.05¾	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.05⅝	.05½	.05½		.05½	
Grade B, 76-83.9, 375 e.p., rec. 85%	.04¾	.05	.05¼		.05¼	
Grade BB, 84-92, 375 e.p., rec. 85%	.04¾	.05	.05¼		.05¼	
Grade C, 80-92, 375 e.p., rec. 78%	.04½		.05		.05	
NORTH LOUISIANA—						
Grade AA, 80-87, 375 e.p., rec. 90%	.05¾		.06		.06	
Grade BB, 84-92, 375 e.p., rec. 85%	.05½		.05⅞		.05⅞	
Grade C, 80-92, 375 e.p., rec. 78%	.05¼		.05½		.05½	
CALIFORNIA—						
75-85, 375, 390 endpoint	.08½	.09	.09	.09½	.09	.09½
CHICAGO DISTRICT (Based on Group 3)—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.05½		.05¾		.05¾	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.05⅝	.05½	.05½		.05½	
Grade B, 76-83.9, 375 e.p., rec. 85%	.04¾	.04⅞	.05¼		.05¼	
Grade BB, 84-92, 375 e.p., rec. 85%	.04¾		.05¼		.05¼	
Grade C, 80-90, 375 e.p., rec. 78%	.04½		.05		.05	

Note: All natural gasoline, except California, is noncorrosive.

BURNING OIL

	Dec. 6		Nov. 29		Nov. 22	
KANSAS—						
41-43 water white Kerosene	.04¾		.04¾	.05	.04¾	.05
OKLAHOMA (Group 3)—						
41-43 water white Kerosene	.04⅜	.04⅝	.04½	.04⅝	.04½	.04¾
42-44 water white Kerosene	.05		.05	.05⅛	.05	.05⅛
NORTH LOUISIANA—						
41-43 prime white Kerosene	.05	.05¼	.05	.05¼	.05	.05¼
NORTH TEXAS—						
41-43 water white Kerosene	.04½		.04½	.04⅝	.04½	.04⅝
40-42 water white Kerosene	.04¼		.04¼	.04½	.04¼	.04½
ARKANSAS—						
41-43 water white Kerosene	.05	.05⅛	.05	.05¼	.05	.05¼
PENNSYLVANIA—						
43 Kerosene prime white	.06⅜	.06⅝	.06⅜	.06⅝	.06¼	.06½
45 Kerosene water white	.06½	.06¾	.06½	.06¾	.06½	.06¾
46 Kerosene water white	.06¾	.07	.06¾	.07	.06¾	.07
47 Kerosene water white	.07	.07¼	.07	.07¼	.07	.07¼
300 Mineral Seal	.07¼	.07½	.07¼	.07½	.07¼	.07½
CALIFORNIA—						
38-40 water white Kero. (high burning test)	.05½	.06	.05½	.06	.05½	.06
Engine distillate, 43-45, 445 endpoint	.07	.07¾	.07	.07¾	.07	.07¾
Engine distillate, 42-44 480 endpoint	.06¾	.07	.06¾	.07	.06¾	.07
CHICAGO DISTRICT (Based on Group 3)—						
41-43 water white Kerosene	.04½	.04⅝	.04½	.04⅝	.04½	.04¾
42-44 water white Kerosene	.05	.05⅛	.04⅞	.05	.05	

FUEL OILS

	Dec. 6		Nov. 29		Nov. 22	
KANSAS—						
22-26 Fuel Oil	.80	.85	.80	.85	.80	.85
18-22 Fuel Oil	.80		.80		.80	
32-36 Gas Oil	.02½		.02½		.02½	
38-40 Distillate	.03¼	.03⅜	.03¼	.03⅜	.03¼	.03⅜
OKLAHOMA (Group 3)—						
Below 18 Fuel Oil	.70	.75	.70	.75	.70	.75
18-22 Fuel Oil	.75	.77½	.75	.80	.75	.80
22-26 Fuel Oil	.77½	.80	.80	.82½	.80	.82½
24-26 Fuel Oil	.80	.85	.82½	.85	.82½	.85
26-30 Fuel Oil	.85	.87½	.87½		.87½	
28-30 Fuel Oil	.90	.95	.92½	.95	.92½	.95
32-36 Gas Oil (dark)	.02¼	.02⅜	.02⅜	.02½	.02⅜	.02½
32-36 Gas Oil (straw overhead)	.02⅜	.02½	.02½		.02½	
36-38 Distillate	.03	.03⅛	.03	.03⅛	.03	.03⅛
38-40 Straw Distillate	.03⅛	.03¼	.03⅛	.03¼	.03⅛	.03¼
NORTH TEXAS—						
24-26 Fuel Oil (sellers' cars)	.75	.80	.80	.82½	.80	.82½
32-36 Gas Oil (straw)	.02¼		.02¼	.02½	.02¼	.02½
38-40 Straw Distillate	.03		.03	.03⅛	.03	.03⅛
NORTH LOUISIANA—						
18-20 Fuel Oil	1.00		1.00		.90	1.00
32-36 Gas Oil	.03	.03¼	.03	.03¼	.03	.03¼
ARKANSAS—						
36-38 Distillate	.03¼	.03½	.03¼	.03½	.03¼	.03½
32-36 Gas Oil (straw)	.03	.03¼	.03	.03¼	.03	.03¼
16-20 Refinery Fuel Oil	.95	1.00	.95	1.00	.90	1.00
GULF COAST (South Texas)—						
Gas Oil	.03⅞	.04	.03⅞	.04	.03⅞	.04
Fuel Oil	1.25	1.30	1.25	1.30	1.25	1.30
PENNSYLVANIA—						
30-34 Fuel Oil	.04¼	.04⅝	.04¼	.04½	.04¼	.04½
36-40 Fuel Oil	.04⅞	.04⅝	.04⅜	.04⅝	.04⅜	.04⅝
CALIFORNIA—						
33-36 Distillate	.03½	.03¾	.03½	.03¾	.03½	.03¾
27-32 Distillate	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
*15-20 Fuel Oil, Bunkers (at tide water)	1.00		1.00		1.00	
15-20 Fuel Oil (cargo lots)	.90		.90		.90	
27 plus Diesel	1.15	1.19	1.15	1.19	1.15	1.19
CHICAGO DISTRICT (Based on Group 3)—						
24-26 Fuel Oil (sellers' cars) Group 3	.80	.82½	.80	.82½	.82½	.85
22-26 Fuel Oil (sellers' cars) Group 3	.77½	.80	.77½	.80	.80	.82½
18-22 (Group 3)	.75	.77½	.75	.77½	.75	.80
16-20 Smackover	1.00		.90	.95	1.00	1.02½
32-36 Gas Oil (zero)	.02⅝	.03⅛	.02⅝	.03	.02⅜	.03⅛
32-36 Gas Oil (industrial)	.02⅝	.03	.02⅜	.02⅝	.02½	.02⅜
36-38 Distillate	.03⅛	.03¼	.03	.03¼	.03⅛	.03¼
38-40 Straw Distillate	.03¼	.03⅜	.03¼	.03⅝	.03⅛	.03⅜

*Bunkers.

LUBRICATING OIL AND WAX

	Dec. 6		Nov. 29		Nov. 22	
OKLAHOMA (Group 3)—						
100 vis., 2 color, 20-25 cold test	.06¼	.06½	.06¼	.06½	.06¾	.06½
100 vis., 3 color, 20-25 cold test	.06	.06¼	.06	.06¼	.06	.06¼
150 vis., 3 color, 20-25 cold test	.08¼	.08½	.08¼	.08½	.08¼	.08½
150 vis., 4 color, 20-25 cold test	.08	.08¼	.08	.08¼	.08	.08¼
180 vis., 3 color, 23-28 cold test	.09⅜	.10	.09⅜	.10	.09⅜	.10
180 vis., 4 color, 23-28 cold test	.09¼	.09¾	.09¼	.09¾	.09¼	.09¾
180 vis., 5 color, 23-28 cold test	.09⅛	.09½	.09⅛	.09½	.09⅛	.09½
200 vis., 3 color, 23-28 cold test	.09½	.10½	.09½	.10½	.09½	.10½
200 vis., 4 color, 23-28 cold test	.09⅝	.10¼	.09⅝	.10¼	.09⅝	.10¼
200 vis., 5 color, 23-28 cold test	.09¼	.10	.09¼	.10	.09¼	.10
240 vis., 3 color, 25-30 cold test	.13¾	.14	.13¾	.14	.13¾	.14
240 vis., 4 color, 25-30 cold test	.13¼	.13½	.13¼	.13½	.13¼	.13½
240 vis., 5 color, 25-30 cold test	.12¼	.12½	.12¼	.12½	.12¼	.12½
280 vis., 3 color, 25-30 cold test	.15½	.16	.15½	.16	.15½	.16
280 vis., 4 color, 25-30 cold test	.15	.15½	.15	.15½	.15	.15½
280 vis., 5 color, 25-30 cold test	.14	.14½	.14	.14½	.14	.14½
Cylinder Stocks:						
600, steam refined, light green	.08	.09½	.08	.09½	.08	.09½
600, steam refined, dark green	.07	.07½	.07	.07½	.07	.07½
190-200 vis. @ 210 Bright Stock	.30	.32	.30	.32	.30	.32
150-160 vis. @ 210 Bright Stock	.24	.25	.24	.25	.24	.25
Waxes:						
124-126 White Crude Scale Wax	.02½	.02⅝	.02⅝		.02⅝	
PENNSYLVANIA—						
34 Neutral	.07½	.07¾	.07½	.07¾	.07½	.08
34 Sundebloom	.07¾	.08	.07¾	.08	.08¾	.09
36 Miners' Neutral	.07½	.07¾	.07½	.07¾	.07¾	.08
150, 3 color	.26½	.27	.26½	.27	.27¼	.27¾
180, 3 color	.31	.31½	.31	.31½	.31	.31½
200, 3 color	.32	.32½	.32	.32½	.32	.32½
220, 3 color	.34½	.35	.34½	.35	.36	.36½
600, steam refined	.09¼	.09¾	.09¼	.09¾	.10¼	.10½
635, steam refined	.10½	.11	.10½	.11	.11	.11½
650, steam refined	.11¼	.11¾	.11¼	.11¾	.12	.12½
600, Pennsylvania flash	.15	.16	.15	.16	.17	.17½
*550, E filtered	.15¾	.16	.15¾	.16	.15¾	.16
*600, E filtered	.17	.17½	.17	.17½	.17	.17½
600, E filtered	.15½	.16	.15½	.16	.16	.16½
600, D filtered	.24½	.25	.24½	.25	.25½	.26
550, E filtered	.15½	.16	.15½	.16	.17½	.18
550, D filtered	.21½	.22	.21½	.22	.21½	.22
Pennsylvania Bright Stock	.28	.29	.28	.29	.29	.30
†122-124 White Crude Scale Wax	.02¾	.02⅞	.02⅞	.03	.03	.03⅛
124-126 White Crude Scale Wax	.02⅞	.03	.03		.03¼	.03¼

*At Warren, Pa. †At New York City.

GULF COAST (South Texas)—						
No. 2 color, 100 vis., pale oil	.06¼	.07	.06¼	.07	.06	.06½
No. 3 color, 200 vis., pale oil	.08½	.09½	.08½	.09½	.08½	.09
No. 3 color, 300 vis., pale oil	.10	.10½	.09½	.10½	.09½	.10½
No. 3½ color, 500 vis., pale oil	.11½	.12	.11½	.12	.11½	.12
No. 4 color, 750 vis., pale oil	.14½	.15	.14	.15	.14½	.15
No. 5 to 6 color, 200 vis., red oil	.07½	.08	.07½	.08	.07	.07½
No. 5 to 6 color, 300 vis., red oil	.08½	.09	.08½	.09	.08½	.09
No. 5 to 6 color, 500 vis., red oil	.09½	.10½	.09½	.10½	.09½	.10
No. 5 to 6 color, 750 vis., red oil	.12½	.13	.12½	.13	.12½	.13
No. 2 color, 200 vis., pale filtered	.11½	.13	.11½	.13	.11½	.13
No. 2 color, 300 vis., pale filtered	.13	.13½	.12	.13	.12	.13
No. 2½ color, 500 vis., pale filtered	.13¼	.13½	.12¼	.13	.12¼	.13
No. 2½ color, 750 vis., pale filtered	.17½	.19	.17	.18	.17	.18

REFINERY AND CRUDE PRICES

Quotations on Principal Refined Products and Crude Petroleum Markets in All the American Oil Fields

CALIFORNIA—						
130 vis.. 2½-3 color	.09	.10	.09	.10	.09	.10
200 vis.. 2½-3 color	.10	.10½	.10	.10½	.10	.10½
300 vis.. 3-3½ color	.10½	.11	.10½	.11	.10½	.11
350 vis.. 3½-4 color	.11	.12	.11	.12	.11	.12
400 vis.. 3½-4 color	.13	.14	.12	.14	.13	.14
Red Neutral:						
200 vis.. 4½-5 color	.08½	.09	.08½	.09	.08½	.09
300 vis.. 5-6 color	.09	.09½	.09	.09½	.09	.09½
400 vis.. 5-6 color	.11	.11½	.11	.11½	.11	.11½
500 vis.. 4½-5 color	.11¼	.12	.11¼	.12	.11¼	.12
500 vis.. 5-6½ color	.11	.11½	.11	.11½	.11	.11½
600 vis.. 6 plus color	.12	.12½	.12	.12½	.12	.12½

Note: Bright stocks are not manufactured commercially on the Pacific Coast.

NEW YORK (BAYONNE) REFINERY PRICES

	Dec. 6	Nov. 29	Nov. 22
Gasoline U. S. Motor, 58-60 437	.08¼	.08¼	.08¼
Kerosene, water white, 41-43	.07½	.07½	.07½
*Fuel Oil, bunker "C," 14-16, per bbl.	1.35	1.40	1.40
*Fuel Oil, Diesel, 28-30, per bbl.	2.10	2.10	2.10
Gas Oil, 28 plus	.05½	.05½	.05½
25 pale Paraffin Oil	.12	.12	.12
28 pale Paraffin Oil	.07¼	.07¼	.07¼
285 red Paraffin Oil	.11½	.11½	.11½
250 red Paraffin Oil	.10½	.10½	.10½
225 red Paraffin Oil	.10	.10	.10
200 red Paraffin Oil	.09½	.09½	.09½
Refined Wax:			
120-122 a.m.p., per lb.	.03⅞	.03⅞	.03⅞
125-127 a.m.p., per lb.	.04	.04	.04
130-132 a.m.p., per lb.	.04¾	.04¾	.04¾
135-137 a.m.p., per lb.	.05½	.05½	.05½
Petrolatum, in bbls., carload lots, per lb:			
Dark green	.01⅞	.01⅞	.01⅞
Amber	.03⅜	.03⅜	.03⅜
Extra amber	.03¾	.03¾	.03¾
Cream	.06¼	.06¼	.06¼
Lily white	.09	.09	.09

*Lighterage 6.5c a barrel extra.

NEW YORK (BAYONNE) EXPORT PRICES

	Dec. 6	Nov. 29	Nov. 22
Gasoline, U. S. Motor, 58-60 437, in cases	.2390	.2390	.2390
Kerosene, standard white, in cases	.1715	.1715	.1715
Kerosene, water white, in cases	.1815	.1815	.1815
600 steam refined cylinder stock, in bbls.	.17	.17	.17
635 steam refined	.19	.19	.19
650 steam refined	.20	.20	.20
600 Pennsylvania flash	.23	.23	.23
630 Pennsylvania flash	.35	.35	.35
600 Warren E.	.25	.25	.25
600 Oil City E	.24	.24	.24
Light 135 Bright Stock	.40	.40	.40
Dark 135 Bright Stock	.38	.38	.38

LOS ANGELES EXPORT PRICES

	Dec. 6		Nov. 29		Nov. 22	
Kerosene, water white	.04½	.04¾	.04¾	.04¾	.04½	.04¾
U. S. Motor Gasoline, 53-55 437 ep.	.06	.06⅛	.06	.06⅛	.05¾	.06

CALIFORNIA CRUDE PRICES
Standard Oil Co.-Union Oil Co. (Effective April 1, 1927)*

Gravity—	Fullerton, Seal Beach, Long Beach, Huntington Beach, Richfield, Rosecrans-Dom'gues., Torrance-Inglewood 1	Whittier, La Habra, Montebello 2	Kern River, Newhall-McKittrick, Midway-Sunset, Elk Hills, Lost Hills, Belridge, Buena Vista Hills, Coyote 3 4	Santa Fe Springs 5	Coalinga 6	Wheeler Ridge 7	Santa Maria, Ventura, Orcutt, Salt Lake 8
14°	.85	.85	.75 .85	....	.75	.75	.85
15°	.85	.85	.75 .85	....	.75	.75	.85
16°	.85	.85	.75 .85	....	.75	.75	.85
17°	.85	.85	.75 .85	....	.75	.75	.85
18°	.85	.85	.75 .85	....	.75	.75	.85
19°	.85	.85	.75 .85	....	.75	.75	.85
20°	.85	.85	.77 .85	....	.76	.76	.85
21°	.86	.85	.79 .86	.85	.77	.77	.85
22°	.87	.85	.81 .87	.85	.78	.78	.85
23°	.88	.85	.83 .88	.85	.79	.79	.85
24°	.89	.85	.85 .89	.85	.80	.80	.85
25°	.90	.86	.87 .90	.86	.81	.81	.86
26°	.92	.87	.89 .91	.87	.83	.82	.87
27°	.94	.88	.91 .92	.88	.85	.83	.88
28°	.96	.89	.93 .93	.89	.87	....	.89
29°	.98	.90	.96 .94	.91	.89	....	.91
30°	1.00	.91	.99 .95	.93	.91	....	.93
31°	1.03	....	1.02	.95	.93	....	.95
32°	1.06	....	1.05	.97	.95	....	.97
33°	1.09	....	1.08	.99	.97	....	.99
34°	1.12	....	1.11	1.01	.99	....	1.01
35°	1.16	....	....	1.03	1.01	....	1.03
36°	1.18	....	....	1.06	....	....	1.06
37°	1.21	....	....	1.09	....	....	1.09
38°	1.24	....	....	1.12	....	....	1.12
39°	1.27	....	....	1.15	....	....	1.15
40°	1.30	....	....	....	....	....	....
41°	1.33	....	....	....	....	....	....
42°	1.36	....	....	....	....	....	....

*Column 1—Long Beach, Seal Beach and Huntington Beach crudes, 14 to 32 degrees, inclusive; Richfield and Fullerton, 14 to 30 degrees; Torrance and Inglewood, 14 to 28 degrees; Dominguez, 24 to 42 degrees. Rosecrans crude ranges from 14 to 42 degrees, but only Union Oil Co. posts below 24 degrees.

Column 2—Whittier crude, 14 to 22 degrees; Montebello, 14 to 30 degrees.

Column 3—Kern River, Newhall and McKittrick, 14 to 19 degrees; Midway-Sunset, Buena Vista and Elk Hills, 14 to 33 degrees; Lost Hills and Belridge, 14 to 34 degrees.

Column 8—Salt Lake, 14 to 19 degrees, inclusive; Santa Maria, 14 to 30 degrees; Ventura and Orcutt, 14 to 39 degrees. Posted only by Union Oil Co.

CRUDE OIL GRAVITY PRICE TABLE

Gravity—	Okla., Kans., N. C. Tex., La.-Ark. 1	Smackover, Ark. 2	Stephens, Ark. 3	Gray County (Texas Panhandle) 4	Crane, Upton, Pecos, Crockett Counties (West Texas) 5	Salt Creek, Wyo. 6	Grade B & Light Crude (G. Coast) 7	Somerset (South Central Texas) 8
Below 24	....	.85	....	....	....	....	....	....
24 and above	....	1.00	....	....	....	....	....	....
Below 25	....	....	....	....	....	....	1.16	....
25 to 25.9	....	....	....	....	....	....	1.17	....
Below 26	....	....	....	....	....	....	....	....
26 to 26.9	....	....	....	....	.60	....	....	....
27 to 27.9	....	....	....	....	.60	....	1.19	....
Below 28	(*)	....	1.00	....	.60	....	1.21	....
28 to 28.9	1.12	....	1.02	.80	.60	....	....	....
29 to 29.9	1.14	....	1.04	.82	.60	1.14	1.23	....
30 to 30.9	1.16	....	1.06	.84	.60	1.16	1.25	....
31 to 31.9	1.18	....	1.08	.86	.60	1.18	1.27	....
32 to 32.9	1.20	....	1.10	.88	.60	1.20	1.29	....
33 to 33.9	1.22	....	....	.90	.60	1.22	1.31	1.05
34 to 34.9	1.24	....	....	.92	.60	1.24	1.33	1.07
35 to 35.9	1.26	....	....	.94	.60	1.26	1.35	1.09
36 to 36.9	1.28	....	....	.96	.60	1.28	1.37	1.11
37 to 37.9	1.30	....	....	.98	....	1.30	....	1.13
38 to 38.9	1.32	....	....	1.00	....	....	....	1.15
39 to 39.9	1.34	....	....	1.02	....	....	....	1.17
40 to 40.9	1.36	....	....	1.04	....	....	....	....
41 to 41.9	1.38	....	....	1.06	....	....	....	....
42 to 42.9	1.40	....	....	1.08	....	....	....	....
43 to 43.9	1.42	....	....	1.10	....	....	....	....
44 to 44.9	1.44	....	....	1.12	....	....	....	....
45 to 45.9	1.46	....	....	....	....	....	....	....
46 to 46.9	1.48	....	....	....	....	....	....	....
47 to 47.9	1.50	....	....	....	....	....	....	....
48 to 48.9	1.52	....	....	....	....	....	....	....
49 to 49.9	1.54	....	....	....	....	....	....	....
50 to 50.9	1.56	....	....	....	....	....	....	....
51 to 51.9	1.58	....	....	....	....	....	....	....
52 and above	1.60	....	....	....	....	....	....	....

Column 1—Magnolia Petroleum Co. posted new schedule September 14, making price below 30 gravity $1.05 per barrel, with 2 cents increase per degree higher in gravity, taking 30-30.9 gravity at $1.16 as basis, with a top price of $1.60 for 52 and above.

Oklahoma: Prairie Oil & Gas Co., Sinclair Oil & Gas Co., Gypsy Oil Co., March 12; Carter Oil Co., The Texas Company, March 14.

North Central Texas—[Including Ranger, Mexia, Powell, Richland, Wortham, Lytton Springs (Southwest Texas), Iatan and Panola (Magnolia only), Currie, Nocona, Moran and Corsicana light]; Texas, Prairie, Sinclair and Gulf, March 12; The Texas Company, Humble Oil & Refining Co., March 14.

Kansas—Prairie, Sinclair, March 12; Carter, Texas, March 14.

Arkansas and North Louisiana—[Caddo, Bull Bayou, Crichton, De Soto, Haynesville, Homer and El Dorado only]; Standard Oil Co. of Louisiana, March 14; The Texas Company, March 14; Magnolia Petroleum Co., Pine Island, Haynesville and Bull Bayou, El Dorado, Gulf Pipe Line Co., March 14.

Column 2—November 19, Louisiana Oil Refining Co. On November 31, Standard Oil Co. of Louisiana, Magnolia Petroleum Co., Gulf Refining Co., and Atlantic Producing Co.

Column 3—Atlantic Oil Producing Co., March 14.

Column 4—Humble Oil & Refining Co. and Gulf Pipe Line Co., March 14. On August 23 Magnolia Petroleum Co. posted flat 75 cents.

Column 5—Humble Oil & Refining Co., August 23; Kay County Gas Co., Magnolia Petroleum Co., and Gulf Pipe Line Co., August 24.

Column 6—Midwest Refining Co., March 12. All crude over 37 gravity, $1.30 per barrel.

Column 7—Humble Oil & Refining Co. and other major buyers (schedule ends "35 and above"), March 14, with exception of Magnolia Petroleum Co., which stops at 31 degrees gravity. Sun Pipe Line Co. posts 2 cents differential for each degree above 35 gravity and $1.47 for 40 gravity and above.

Column 8—Grayburg Pipe Line Co. and Pioneer Oil & Refining Co., April 7.

*Prices for crude below 28 gravity; Oklahoma, Kansas and Texas, Magnolia Petroleum Co., $1.10, March 12; Arkansas, North Louisiana, March 14. Other companies, 2 cents less for each degree, with exception of Humble Oil & Refining Co., which pays 90 cents for crude below 25 degrees gravity, effective November 16.

CRUDE OIL PRICES

OKLAHOMA, KANSAS, NORTH AND EAST CENTRAL TEXAS

*Corsicana heavy (March 14, 1927).....$1.00
Other fields .....See gravity table

*Posted by Magnolia Petroleum Co.

TEXAS PANHANDLE

*Carson County .....$ .75
*Hutchinson County 75
*Wheeler County 75
Gray County .....See gravity table

*Humble Oil & Refining Co.
Magnolia Petroleum Co., Gulf Pipe Line Co., and Kay County Gas Co., August 23.

*Iatan.....Same as North Texas
Crane-Upton-Crockett.....See gravity table
**Glasscock .....$ .80

*Includes Howard County and Westbrook Fields. Kay County Gas Co. pays $1.05 for Howard County crude, effective May 21.
**Magnolia Petroleum Co., Oct. 24.

ARKANSAS-NORTH LOUISIANA

Cotton Valley (Dec. 2) ..... .85
Bellevue (Feb. 24, 1927) 1.25
Urania (Nov. 18, 1927) ..... .75
East El Dorado (Sept. 20) ..... .90
O her fields.....See gravity table

Note—Cotton Valley and Bellevue, Standard Oil Co. of Louisiana, Louisiana Oil Refining Co., Gulf Refining Co. and Magnolia Petroleum Co.; Urania, Louisiana Oil Refining Corp.; East El Dorado Magnolia Petroleum Co., Gulf Refining Co.

GULF COAST

(Goose Creek, Hull, Liberty, West Columbia, Orange, Boling, Sour Lake, Humble, High Island, Pierce Junction and Spindletop.)

‡Grade A (March 14) $1.20
Grade B .....See gravity table
*Jennings, La. (March 14).....$1.05
†Saratoga, Batson, Dayton (March 14, 1927) $1.20
§Markham (March 14) 1.00

*Gulf Pipe Line Co. †Sun Pipe Line Co. ‡Humble Oil & Refining Co. and other major buyers. §The Texas Company.

SOUTH CENTRAL AND SOUTHWESTERN TEXAS

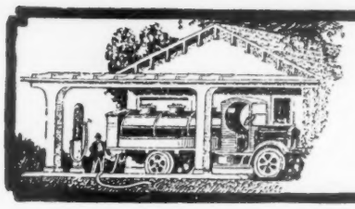
*Luling (May 5) $1.00
†Mirando (March 14) 1.00
Rockdale-Minerva (April 15):
38-38.9 gravity 1.27
39-39.9 gravity 1.29
40 and above 1.31
*Thrall .....
Callihan (May 15) 1.75
Lytton Springs (Lockhart) See gravity table
Somerset .....See gravity table

*Posted by Magnolia Petroleum Co. Thrall prices same as North Central Texas less 19½ cents per cwt. freight.
†Magnolia Petroleum Co., Humble Oil & Refining Co., Crown Central Pipe Line Co.

ROCKY MOUNTAIN STATES
Ohio Oil Co.-Midwest Refining Co.
(Effective March 14)

Rock Creek, Wyo. (March 12) $1.25
Salt Creek .....See gravity table
Big Muddy (March 12) 1.25
Mule Creek (May 1) 1.10
Grass Creek, heavy ..... .90
Grass Creek, light 1.33
Elk Basin (March 12) 1.33
Lance Creek (March 12) 1.33
Poison Spider 1.00
Notches ..... .65
Rex Lake (February 22) 1.10
Osage 1.33
Lost Soldier (contract) ..... .95
Greybull-Torchlight 1.33
Hamilton Dome ..... .85
Cat Creek (Mont.) 1.33
Sunburst (Mont.) 1.35

(Continued on Page 144)



TANK WAGON MARKETS

Tank wagon quotations for gasoline and kerosene in United States as furnished by the larger marketing concerns Dec. 6.

ALL TANK WAGON AND SERVICE STATION QUOTATIONS INCLUDE TAXES

STANDARD OIL CO. (INDIANA)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Chicago dist.	16.0	18.0	2.0	12.0
Decatur, Ill.	10.5	12.5	2.0	12.1
E. St. Louis	15.1	17.35	2.0	11.2
Joliet	16.4	18.4	2.0	12.3
Peoria	12.2	12.2	2.0	12.1
Quincy	16.2	18.2	2.0	11.9
Davenport, Ia.	15.5	17.5	3.0	12.3
Des Moines	13.9	15.9	3.0	12.3
Keokuk	17.5	19.5	3.0	12.3
Sioux City	17.1	19.1	3.0	11.9
Duluth, Minn.	15.5	17.5	2.0	12.9
Minneapolis	14.0	14.0	2.0	12.9
Mankato	14.1	16.1	2.0	12.7
LaCross, Wis.	17.2	19.2	2.0	13.0
Milwaukee	16.1	18.1	2.0	11.9
Madison	16.3	18.3	2.0	12.1
Detroit, Mich.	15.8	17.8	3.0	13.7
Grand Rapids	14.0	16.0	3.0	13.6
Saginaw	17.9	19.9	3.0	13.8
Evansville, Ind.	17.0	19.0	3.0	13.0
Ft. Wayne	14.0	14.0	3.0	13.4
Indianapolis	14.2	15.2	3.0	12.2
South Bend	17.4	17.4	3.0	13.4
Fargo, N. D.	15.0	17.0	2.0	14.9
Huron, S. D.	19.5	21.5	4.0	13.9
Sioux Falls	15.0	17.0	4.0	13.4
*K. C., Mo.	14.9	16.9	3.0	10.6
*Springfield	16.8	18.8	3.0	11.5
*St. Louis	15.6	17.9	2.5	11.3
*St. Joseph	14.5	16.5	3.0	11.2
Wichita, Kans.	14.8	16.8	2.0	10.8
Bartlesville, Ok.	15.8	17.8	3.0	10.8

NAPHTHAS

	Tank wagon	Tank car
Oleum spirits	16.0	10 75
V. M. & P. naphtha	18.0	12.75
Cleaner's naphtha	18.0	13.75
Stanisol	19.0	....

Tank wagon prices f.o.b. Chicago; tank car prices f.o.b. Whiting.

STANOLIND FURNACE OIL

Less than 100 gallons	9.0
100 to 799 gallons	8.0
800 or more gallons	7.5

Tank wagon prices of gasoline subject to discount of 1 cent a gallon on dumps of 50 gallons or more throughout territory except Chicago district where discount applies only to dumps of 100 gallons. Kerosene subject to 1 cent discount on dumps of 50 gallons or more.

Outside the Chicago district, the following quantity discount schedule is in effect on monthly tank wagon deliveries of gasoline; 6,000 gallons or more, 1½ cents; 10,000 gallons or more, 2 cents; 15,000 gallons or more, 3 cents. These discounts include the 1 cent allowed on dumps of 50 gallons or more at one delivery.

Within the Chicago district, the following quantity discount schedule is in effect on tank wagon deliveries of gasoline; 750 to 2,000 gallons, one-half cent; 2,000 to 3,000 gallons, three-fourths cent; 3,000 to 6,000 gallons, 1 cent; 6,000 to 10,000 gallons, 1½ cents; 10,000 to 15,000 gallons, 2 cents; 15,000 gallons or more, 3 cents. These discounts are in addition to the special discount of 1 cent on dumps of 100 gallons or more at one delivery.

If the quantity bought during the year is equal to or exceeds 12 times the agreed monthly quantity, the discount is paid or credited on the entire quantity at the close of the term less the monthly payments made during the year.

*State tax 2 cents; remainder city tax.

OHIO

Standard Oil Co. (Ohio)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
All Ohio points	17.0	19.0	3.0	14.5

SOUTHWESTERN DISTRICT

Magnolia Petroleum Co.*

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Dallas, Tex.	14.0	17.0	3.0	11.0
Fort Worth	14.0	16.0	3.0	10.0
Houston	13.0	15.0	3.0	15.0
San Antonio	13.0	15.0	3.0	10.0
El Paso	14.0	15.0	3.0	16.0
Texarkana	15.0	18.0	3.0	12.0
Muskogee, Ok.	15.0	18.0	3.0	10.0
Okla. City	13.0	14.0	3.0	10.0
Tulsa	13.0	14.0	3.0	10.0
Ft. Smith, Ark.	14.0	17.0	3.0	12.0
Little Rock	16.0	16.0	5.0	12.0

*The following is the schedule of discounts on quantity gasoline sales adopted by the Magnolia Petroleum Co. in Oklahoma: Over 750 gallons a month, one-half cent; over 2,000 gallons, three-quarters cent; over 3,000 gallons, 1 cent; over 4,500 gallons, 1¼ cents; over 6,000 gallons, 1½ cents; over 8,000 gallons, 1¾ cents; over 10,000 gallons, 2 cents. If the quantity bought during the year is 12 times the monthly agreed purchases, the discount will be paid or credited on the entire quantity for the year less any monthly purchases.

The schedule on service station deliveries is: Over 200 gallons a month, 1 cent; over 300 gallons a month, 1¼ cents; over 400 gallons, 1½ cents; over 500 gallons a month, 1¾ cents; over 600 gallons, 2 cents. The same rule applies for annual purchases in the tank wagon discounts.

CENTRAL SOUTH DISTRICT

Standard Oil Co. (Louisiana)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
*N. Orleans, La.	15.5	17.5	3.0	14.0
Baton Rouge	14.0	17.0	2.0	12.5
Alexandria	15.0	18.0	2.0	14.0
LaFayette	15.0	18.0	2.0	13.5
Lake Charles	15.5	18.5	2.0	14.0
Shreveport	15.5	18.5	2.0	13.0
Kn'xville, T'nn.	19.5	22.5	3.0	15.0
Memphis	15.0	16.5	3.0	14.0
Chattanooga	19.5	22.5	3.0	15.0
Nashville	18.0	21.0	3.0	15.0
Bristol	19.0	22.0	3.0	14.0
Lit. Rock, Ark.	16.0	16.0	5.0	12.0

*Tax of 3 cents includes city tax of 1 cent.
*Louisiana kerosene prices include 1-cent state tax and 1-cent parish tax.

SOUTHERN DISTRICT

Standard Oil Co. (Kentucky)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Atlanta, Ga.	14.0	16.0	4.0	15.5
Augusta	19.0	22.0	4.0	16.5
Macon	19.0	22.0	4.0	16.5
Savannah	17.0	19.0	4.0	14.5
Birm'h'm, Ala.	18.0	21.0	4.0	15.5
Mobile	17.0	20.0	4.0	15.0
Montgomery	19.0	22.0	5.0	16.5
Clarks'le, Miss.	17.0	20.0	4.0	12.5
Jackson	17.0	20.0	4.0	13.5
Natchez	16.5	19.5	4.0	14.0
Gulfport	18.5	21.5	6.0	14.0
Vicksburg	16.5	19.5	4.0	14.0
Jack'ville, Fla.	18.0	21.0	5.0	14.0
Miami	20.0	23.0	5.0	15.5
Pensacola	19.0	22.0	5.0	14.0
Tampa	18.0	21.0	5.0	14.0
Lexington, Ky.	18.0	21.0	5.0	15.5
Covington, Ky.	19.0	22.0	5.0	15.5
Louisville	18.0	21.0	5.0	15.0

In addition to the state tax of 2 cents on gasoline, Montgomery has city tax of 1 cent on gasoline. Kerosene prices in Georgia includes 1 cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene only. Pensacola tax includes 1 cent city levy. Gulfport tax includes privilege tax of 2 cents in addition to state tax.

PENNSYLVANIA-DELAWARE AND PART NEW ENGLAND

Atlantic Refining Co.

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Pittsburgh, Pa.	16.0	*22.0	...	14.0
Philadelphia	14.0	17.0	...	14.0
Scranton	16.0	*22.0	...	14.0
Allentown	16.0	*22.0	...	14.0
Altoona	16.0	*22.0	...	14.0
Erie	14.0	*18.0	...	14.0
Dover, Del.	19.0	22.0	3.0	14.0
Wilmington	19.0	22.0	3.0	14.0
Spring'd, Mass.	17.0	17.0	...	15.0
Worchester	17.0	17.0	...	15.0
Boston	17.0	17.0	...	15.0
Providence, R.I.	19.0	19.0	2.0	15.0
Hartford, Conn.	21.0	22.0	2.0	15.0
New Haven	21.0	22.0	2.0	15.0

*Includes tax of 3.0 cents. Pennsylvania tax is collected by the dealer and paid by him direct to the state.

NEW YORK AND PART OF NEW ENGLAND DISTRICT

Standard Oil Co. (New York)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Albany, N. Y.	17.0	19.0	...	15.0
*New York	17.0	19.0	...	15.0
Buffalo	17.0	19.0	...	14.0
Rochester	13.0	16.0	...	14.0
Syracuse	17.0	19.0	...	15.0
Boston, Mass.	17.0	19.0	...	15.0
Augusta, Me.	21.0	23.0	4.0	15.0
M'nch't'r, N.H.	18.0	22.0	3.0	15.0
Burlington, Vt.	20.0	22.0	3.0	15.0

*Price in steel barrels.

PACIFIC COAST DISTRICT

Standard Oil Co. (California)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
San Francisco	17.0	21.0	3.0	15.5
Pueblo	18.0	18.0	3.0	15.5
Los Angeles	16.5	20.5	3.0	15.5
Reno, Nev.	22.0	26.0	4.0	19.0
Portland, Ore.	17.5	21.5	3.0	16.5
Seattle, Wash.	16.5	20.5	2.0	16.5
Tacoma	16.5	20.5	2.0	16.5
Spokane	20.5	24.5	2.0	20.5
Phoenix, Ariz.	22.0	26.0	3.0	20.5

ATLANTIC COAST DISTRICT

Standard Oil Co. (New Jersey)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Atlantic City	18.0	20.0	2.0	14.0
Newark, N. J.	18.0	20.0	2.0	14.0
Annapolis, Md.	20.0	23.0	4.0	12.0
Baltimore	20.0	23.0	4.0	10.0
Cumberland	20.0	23.0	4.0	14.0
Washington	18.0	21.0	2.0	12.0
Danville, Va.	20.5	....	4.5	14.0
Norfolk	20.5	23.5	4.5	12.0
Petersburg	20.5	23.5	4.5	14.0
Roanoke	20.5	23.5	4.5	14.0
Richmond	18.5	21.5	4.5	14.0
Ch'rlst'n, W.Va.	20.0	23.0	4.0	14.0
Keyser	20.0	....	4.0	14.0
Parkersburg	17.0	20.0	4.0	14.0
Wheeling	20.0	23.0	4.0	14.0
Charlotte, N. C.	20.0	23.0	4.0	14.0
Hickory	20.0	23.0	4.0	14.0
Mt. Airy	20.0	23.0	4.0	14.0
Salisbury	20.0	23.0	4.0	14.0
Charl'stn, S. C.	20.0	23.0	5.0	14.0
Columbia	20.0	20.0	5.0	14.0

NEBRASKA

Standard Oil Co. (Nebraska)

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Omaha	14.25	16.26	2.0	12.25
McCook	14.75	14.75	2.0	11.00
Norfolk	16.75	18.75	2.0	12.75
N. Platte	17.75	19.75	2.0	13.50
Scottsbluff	17.25	19.25	2.0	13.00

ROCKY MOUNTAIN DISTRICT

Continental Oil Co.

	Gasoline Tank wagon	Gasoline Service station	Gasoline Incl'd's tax of	Kero. tank wagon
Denver, Colo.	16.0	16.0	3.0	12.5
Pueblo	15.0	15.0	3.0	14.5
Grand Jnctn.	20.0	22.5	3.0	18.0
Casper, Wyo.	17.0	19.0	3.0	13.0
Cheyenne	18.0	20.0	3.0	14.5
Butte, Mont.	22.0	22.0	3.0	19.0
Helena	22.5	24.5	3.0	19.0
Salt Lake, Utah	21.0	23.0	3.5	17.0
Boise, Idaho	23.5	25.5	4.0	19.0
Twin Falls	23.5	25.5	4.0	19.0
Albu'que, N. M.	21.0	24.0	5.0	17.0

TANK WAGON CHANGES

November 21.—Magnolia Petroleum Co. increased kerosene 1 cent in Oklahoma.

December 2.—Standard Oil Co. of Indiana increased the gasoline tank wagon and station prices 2.4 cents in South Bend, Ind., making each 17.4 cents.

CRUDE PRICE CHANGES

December 1.—Louisiana Oil Refining Co. decreased Cotton Valley, Louisiana, crude 15 cents per barrel making the new price 85 cents. Other major companies met this cut on December 2.

December 4.—Joseph Seep Purchasing Agency increased Pennsylvania crude in New York Transit lines and Bradford oil in the National Transit lines 10 cents to $2.75 per barrel, increased Pennsylvania oil in National Transit lines and in southwestern Pennsylvania lines 5 cents to $2.60; increased Pennsylvania oil in Eureka pipe lines 5 cents to $2.50; increased Cabell crude 10 cents to $1.50 and Somerset crude 10 cents to $1.60.

GULF COAST REFINERS TRY TO MAINTAIN FIRM PRICES

HOUSTON, Tex., Dec. 5.—Although the general lubricating oil market in the Gulf Coast district continued very weak and unsettled the past week, independent refiners Monday were attempting to maintain a firm price structure on products manufactured from strictly Gulf Coast crudes. While these refiners were meeting competition in many cases to prevent excessive loss of business, most of the business transacted at low prices was done on a basis of f.o.b. Houston, but on lubricating oils moved in from out of this district or those products refined from crudes not strictly Gulf Coast production.

The higher viscosity oils continued the weakest point in the market, due largely to the fact that the lowest viscosity cuts are not made freely from the crude from which most of the competition products are manufactured. Refiners of lubricants from strictly Gulf Coast crudes report that they still are able to do some business at higher prices than the present prevailing market.

Refiners here generally are feeling the loss of business on 500 viscosity oils, which customarily is the biggest winter seller, because buyers in many cases are able to obtain still more viscous oils at less price, and thus reduce the quantity purchased.

Fuel oil and gas oils Monday were unchanged with the demand continued fair.

SHREVEPORT MARKETS HAD RATHER DULL WEEK

SHREVEPORT, La., Dec. 5.—Except for a contract for a half million gallons of gas oil for export refiners in this territory had a rather dull week and the price range was without change. This contract will be filled in its entirety by the refiner booking it. Although the price to which it strengthened last week, $1 to $1.05, has not been changed, fuel oil is apt to decline again within the next week or two unless demand improves as movement of the produce is slow and stocks are increasing.

Gasoline was reported by one refiner as showing slight improvement, he quoting U. S. Motor at 6 to 6½ cents, an advance of one-eighth cent.

NORRIS TO ASK INQUIRY

WASHINGTON, D. C., Dec. 3.—Senator Norris of Nebraska will introduce a resolution in the senate calling for a senatorial investigation of the Continental Trading Company of Canada in connection with Teapot Dome.

CRUDE OIL PRICES

(Continued from Page 143)

Artesia (March 12)	1.00
Hogback (N. Mex.) (March 14)	1.38

Note: Salt Creek, Osage, Cat Creek, Greybull and Hogback posted by Midwest Refining Co., and the remainder by the Ohio Oil Co. Both companies post Grass Creek light and Elk Basin.

EASTERN STATES

Joseph Seep Purchasing Agency
(Effective December 4)

Penna Grade Oil in New York Transit Line (New York)	$2.75
Bradford District Oil in National Transit Lines (Pennsylvania)	2.75
Penna Grade Oil in National Transit Lines (Pennsylvania)	2.60
Penna Crude Oil in Southwest Pennsylvania Lines (West Virginia)	2.60
Penna Grade Oil in Eureka Pipe Line lines (Pennsylvania)	2.55
Penna Grade Oil in Buckeye Pipe Line lines (Ohio) (August 23)	2.25
Cabell Grade Oil in Eureka Pipe Line lines (West Virginia) (December 4)	1.50
Corning 35-cent grade oil in Buckeye Pipe Line Co.'s line (March 17)	1.35
Corning 25-cent grade oil in Buckeye Pipe Line Co.'s lines (March 17)	1.45
Somerset Oil in Cumberland Pipe Line lines (Kentucky) (December 4)	1.60
Ragland Grade Oil in Cumberland Pipe Line lines (Kentucky) (August 1)	.95
Keister (Pennsylvania) (August 1)	1.10

MIDDLE WESTERN STATES

Ohio Oil Co.
(Effective March 14)

Lima	$1.71
Wooster	1.57
**Saginaw, Mich., Saginaw Sand (May 27)	2.05
Illinois	1.60
Indiana	1.48
Princeton	1.60
Plymouth	1.33
Waterloo (Nov. 17, 1926)	1.35
*Western Kentucky	1.33
**Saginaw, Mich., Berea Sand (May 27)	1.95
†Cumberland, Barren, Clinton and Monroe Counties, Kentucky (March 16)	1.50
‡Oil in lines of Stoll Oil Refining Co. in Oil City, Ky. (March 16, 1927)	1.50
†Clay County, Tennessee (Nov. 18)	2.35
§Oil Springs (Canada)	2.18
§Petrolia (Canada)	2.11

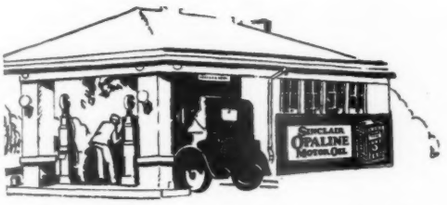
*Posted by Ohio Oil Co.
†Posted by Paragon Development Co.
‡Posted by Stoll Oil Refining Co.
§Posted by Imperial Oil Co., Ltd.
**Posted by Sun Oil Co.

MEXICAN CRUDE

Note—Due to the fact that the exportation of Tuxpam light crude oil his become a negligible factor, prices will no longer be published.

*Panuco heavy (f.o.b. Mex. ports)	$1.15

*17.496 cents tax.



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Also Makers of Sinclair Gasoline and H-C Gasoline

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Oil Securities Strong, Then Lag

West Texas Reports Factor in Movement of Interested Issues. Simms Up on Good Well

The oils started the past week with strength, only to lag at the close with Phillips Petroleum again resting at 40½, a level which has not been reached for the past two months. Phillips has been making slight advances and recessions, but for the most part it has been around 43 and 44.

Transcontinental Oil sagged at the finish when reports of the water situation on its properties at Yates Pool, Pecos County, Texas, were current. This stock which had passed 10 sank to 8¾ on Monday.

The strong points in the oils were Simms Petroleum, which showed an increase of about $2 per share, going from 19½ to 21½ when that company completed a good well in Pecos County, Texas; and Sinclair Consolidated Oil Co., which went to 17½ after a long period of inactivity.

American Republics

The American Republics Corp., whose stock has advanced this week from about 35 to 76, is a holding corporation controlling oil and gas producing properties, prospective acreage and several subsidiary manufacturing companies. Products of the latter cover a wide range of material and equipment used in the oil industry.

The company has $9,075,000 outstanding funded debt, 100,000 shares of preferred stock and 200,000 shares of common of no par value, about half of the latter being controlled by J. S. Cullinan.

In the first nine months of 1927 American Republics Corp. reported net income after charges and taxes of 77 cents a share on the 100,000 shares of preferred stock. Low oil prices and unsatisfactory results of its steel fabricating subsidiaries were largely responsible for this showing. Last year's net was equal to $10.99 a share on the common and in five years to the close of 1926, net aggregated $60 a share on the common. No dividends were paid on the junior stock during that period.

With the development of the various large natural gas properties by other companies recently, considerable interest attaches to the gas properties held by the American Republics Corp. One of these is a 50 per cent ownership of the Union Power Co. This latter about two years ago disposed of 40,000 of its 240,000 acres in the Louisiana gas fields to the Interstate Natural Gas Co. For this acreage Union Power Co. received, among other considerations, about $1,000,000 bonds with warrants and 100,000 shares of Interstate Natural Gas Co. This latter company owns the natural gas pipe line from the Monroe Field, Louisiana, supplying large refineries at Baton Rouge, as well as other consumers there and in New Orleans. Standard Oil is a large factor in the Interstate Natural Gas Co., as it is its refinery which is supplied with gas at Baton Rouge.

The principal Louisiana gas property of the Union Power Co. consists of approximately 200,000 acres virtually in one block, which is of particular interest in view of the two new gas lines being laid, one to Port Arthur and one to Dallas, with a large part, at least, of the gas supply to come from these properties. Also there is a new line projected from Louisiana to St. Louis which also might get part of its gas supply from these gas properties.

The principal oil subsidiary of the American Republics Corp. is the Republic Production Co., which holds the leases on more than 1,000,000 acres, as well as the operating contract by which it manages certain oil producing properties of the Houston Oil Co., and under which it receives one-half of the oil produced therefrom. It has no interest in the Houston Oil Co.'s natural gas developments.

Another subsidiary is the Federal Petroleum Co., with acreage in Louisiana and Arkansas. The Pennsylvania Tank Line, the third largest tank car company, owning and operating about 5,500 cars, is another subsidiary.

Beacon Oil

A special meeting of the stockholders of the Beacon Oil Co. was called for early in December, at which time a vote was to be taken on authorizing the increase in common stock by 500,000 shares. The stockholders will also vote on a plan which will permit of subscription to stock by officers and employes. Stockholders will also be asked to approve the amendment of Section 1 of Article 1 of the by-laws so as to change the date for holding the annual meeting of stockholders from the second Monday in January to the last Tuesday in March.

The Beacon Oil Co. at present has 1,000,000 authorized no par common shares, of which 704,000 shares are outstanding; 30,000 authorized 7½ per cent cumulative preferred stock, of which 24,126 shares of $100 par value are outstanding, and $3,000,000 10-year sinking fund debentures, all issued. There are 75,000 shares of common additional reserved for issue against the exercise of stock purchase warrants attached to debentures.

While official notice to shareholders does not disclose the amount of common stock of the Beacon Oil Co. that will be required for the stock subscription plan, it is understood only a part of the increase in authorized stock will be needed for that purpose. It is expected some additional financing will be done in the form of common stock out of the increase in authorized capital.

Details of the subscription plan for employes and officers follows to a considerable degree similar plans by several Standard Oil companies. The plan is to run for a maximum period of 10 years to June 30, 1937, and be administered by a committee, and the company is to subscribe to the fund 50 per cent of the amount put in by employes. There is a provision that the company receive credit, on its 50 per cent subscription to the fund, for any dividends paid on the common stock held in the employes' fund.

Galena-Signal Oil

The tanker fleet of the Galena Navigation Co., subsidiary of the Galena-Signal Oil Co., is now being operated by the Petroleum Navigation Co., a subsidiary of American Republics. The fleet has not been sold to American Republics, it is said, but sale may ultimately follow the present arrangement.

Two months ago the Galena-Signal company sold its Canadian subsidiary, Galena-Signal Oil Co. of Canada, Ltd., to Imperial Oil, Ltd., a subsidiary of the Standard Oil Co. of New Jersey.

Omar Oil & Gas

The reorganization of the Omar Oil & Gas Co. calls for the incorporation of a new company in Delaware, which will probably be known as the Phoenix Oil Co. and will have authorized $2,000,000 of $1 par preferred and 4,000,000 shares of no par common stock. The preferred will be entitled to cumulative dividends of 6 per cent, accrued unpaid dividends to bear interest at 6 per cent. The preferred stock will share equally with the common in dividends after each class shall have received 6 per cent.

The holders of the 750,000 shares of Omar Oil & Gas Co. stock of $10 par value are asked to exchange their holdings for stock of the new company, which will acquire all the assets of the old company. Holders of each five shares of Omar stock will receive six shares of new preferred and five shares of new common, and for each share of Omar stock held they will be be required to purchase one share of Phoenix preferred at par, with which they will receive three additional shares of new common. The Omar company will be liquidated and holders not electing to participate in the plan will receive only their share of liquidation proceeds.

An audit made following the alleged disclosures of irregularity in the management showed a profit and loss deficit of $5,396,572 on the balance sheet as of July 14, 1927. Charging off of further losses may increase the deficit to $6,685,075.

Dividends

The Southwest Pennsylvania Pipe Line Co. has declared an extra dividend of $2 a share and the regular quarterly dividend of $1, both payable December 31 to stockholders of record December 15.

The Pure Oil Co. has declared the regular quarterly dividend of $1.25 on the 5¼ per cent preferred, $1.50 on the 6 per cent preferred and $2 on the 8 per cent preferred stock, all payable January 2 to stockholders of record December 10.

Tidal Osage Oil Co. has declared a dividend of 50 cents a share on the common, payable December 15 to stockholders of record December 5. An initial dividend of 50 cents was paid September 19.

NEW YORK STOCK EXCHANGE—LIST OF ACTIVE STOCKS

Stocks—	Par	Clos. Dec.5	Quot. Nov.28	1927 High	1927 Low	1926 High	1926 Low	1925 High	1925 Low
Amerada Corp.	..	29	29¾	37½	27⅝	32⅞	24¾	..	..
Atlantic Refining, com.	100	107½	114½	131⅝	107	128⅝	97	117½	95½
Barnsdall "A"	25	24½	25	35½	20⅜	32½	23½	33½	18¾
California Petroleum, com.	25	22	22⅝	32⅞	20	38⅛	30⅝	34⅜	23⅝
Houston Oil	100	158	158	175¾	60½	75	50¼	85	50
Independent Oil & Gas	..	25	24¾	32⅜	17⅝	34	20¼	41¾	13½
Louisiana Oil	10	10⅝	10¼	18⅛	10½	19⅝	12	23⅜	12⅜
Maracaibo	..	12⅝	12	22⅜	12	27⅜	18⅜	35½	20¾
Marland	..	33⅜	35¼	58½	31	63⅜	41¼	60⅛	31½
Mid-Continent Petroleum	..	27⅝	28⅜	39⅜	25½	41	25⅝	38	25⅜
National Supply	50	95	94	95⅝	76	84⅞	55½	71	54⅜
Oil Well Supply	25	35½	35	44⅝	31¼	36	30	38	33⅜
Pan American, B	50	44	50	66⅜	45⅛	72⅜	56⅛	83⅛	59½
Pan American, Western B	..	18⅞	20	37⅝	16⅜	46	34	94⅜	37¼
Phillips Petroleum	..	40½	41⅞	60¼	36⅜	54⅞	42⅛	47⅛	37¼
Producers & Refiners	50	24⅜	25⅝	33⅞	16⅜	26	11	32⅝	12½
Pure Oil, com.	..	25½	25⅝	33½	25	31	25⅜	33⅜	32½
Royal Dutch, N. Y., sh.	13.40	47	47⅛	54⅜	44¼	57⅜	49⅜	57⅜	48¼
Shell Transport	10	42⅜	42⅝	49	41½	48⅜	42	49	30¾
Shell Union, com.	..	25⅜	26⅜	31¾	24⅝	30⅞	24	28⅜	21⅝
Simms Petroleum	10	22	19	22¾	14¼	25⅝	16½	28½	18¾
Sinclair Consolidated	..	16⅜	17	22⅜	15⅛	24⅞	16⅝	24⅜	17
Skelly Oil	25	26¼	27	37⅜	24⅛	37⅛	27	32½	21¾
Standard of California	25	55¼	55⅝	60⅝	50⅝	63½	54	67¼	52½
Standard of New Jersey, com.	25	39⅝	40	41⅞	35⅛	46⅝	37½	47⅛	38⅝
Standard of New York	25	31⅛	31⅜	34½	29¾	47¼	30⅝	48⅝	40
Sun Oil Co.	..	31½	31½	34⅞	30	41⅛	30⅛	43⅞	38½
The Texas Company	25	52⅝	53¼	58	45	58	48	55	43⅝
Texas Pacific Coal & Oil	10	13¼	13⅝	18⅝	12	19½	12⅛	23¼	11
Tide Water Associated Oil	..	15⅞	16⅞	19½	15⅝	21	17	..	..
Transcontinental	..	9⅝	9¼	10⅜	3⅜	5½	3	5⅝	3½
Union Oil of California	25	43¼	43⅞	56½	39⅝	53⅜	37½	43⅜	38½
Union Tank, com.	100	117½	111	120⅞	94	120⅜	84¼ ‡134		118
White Eagle Oil & Refining	..	21⅜	22¾	27½	21¾	29¾	25⅛	28⅜	25⅝
Standard Oils									
Anglo-American Oil	£1	18⅝	19¼	21⅝	17⅛	19¾	16½	26⅜	17⅛
Borne Scrymser	25	57	57	69	49½	75	65	‡240	205
Buckeye Pipe Line	50	58	58½	59	45	59½	42	72	63½
Chesebrough Manufacturing Co.	25	121	133	126	76½	81½	63	74	48¼
Continental	10	18⅝	18⅝	22⅝	16¼	25⅞	10¼	31½	21⅞
Cumberland Pipe Line	100	92	93	‡137	90	137	102	156	128
Eureka Pipe Line	100	68	65	65	47	43⅝	43	96	61¼
Galena Signal, com.	100	7⅛	7	13½	7⅛	32½	9⅞	68½	23½
Humble Oil & Refining Co.	25	65¼	66	66⅝	54	99⅝	52	99	40⅝
Illinois Pipe Line	100	173	181½	181½	123⅝	144	131	154½	124
Imperial Oil	..	61½	59¼	64¾	37⅞	39⅝	32½	39¼	27¼
Indiana Pipe Line	50	72½	93	93	61	68	52¼	84	57⅛
International Petroleum Co.	10	37½	33½	34⅞	28¼	35¼	28⅝	25⅜	20⅜
National Transit Co.	12.50	22⅝	23¼	24¼	12½	30⅝	27¼	25½	16⅝
New York Transit	100	41	41	42	31½	61½	27¼	70	50
Northern Pipe Line	100	99½	96	96	70	80½	64	88	67½
Ohio Oil Co.	25	64⅜	65⅝	69⅝	53	67⅝	56⅜	75¼	60
Penn-Mex Fuel	25	32	33	36¼	12	24¼	15	44	19
Prairie Oil & Gas	25	48⅜	49	55½	45⅝	60¼	49	65½	45⅝
Prairie Pipe Line	100	184	183	189¼	132	137½	122½	129⅜	105
Solar Refining Co.	100	180	180	‡201½	178	212	184½	259	200
South Penn Oil	25	38	38⅜	41½	34½	50	30	‡197	139
Southwest Pa. Line	100	78	70	77	55½	56	47⅜	84	50
Southern Pipe Line	50	21	22	39	18½	27	34	‡103	63
Standard of Indiana	25	78⅝	78¼	80¼	64⅝	70½	60½	70⅜	69¼
Standard of Kansas	25	15½	16¼	20⅜	15⅝	36½	16½	45	30
Standard of Kentucky	25	124¼	125½	125½	111½	134⅜	108	137	114⅝
Standard of Nebraska	25	43	43	49½	43	51⅛	42	‡270	231
Standard of Ohio, com.	100	78	81	81½	72	362	192½	369	338
Swan & Finch, com.	25	18	19½	21	14½	21	18	27	12
Vacuum Oil	25	141⅞	143⅝	147	95½	109⅜	94½	109½	80½
Miscellaneous									
Gulf Oil Corp. of Pa.	25	104	105	105	86¼	95	82½	98¼	63½

*Bid, no sales. ‡Old stock. †New stock. §Ex-dividend.
Quotations furnished by W. J. Wollman & Co.

The Oil and Gas Journal's weekly average price of 20 representative petroleum stocks listed on the New York Stock Exchange was as follows:

Dec. 3	62.06	Oct. 31	69.98	Sept. 26	61.30
Nov. 28	62.93	Oct. 24	60.45	Sept. 19	60.83
Nov. 21	63.56	Oct. 17	59.22	Sept. 12	61.20
Nov. 14	62.78	Oct. 10	58.20	Sept. 5	60.60
Nov. 7	61.30	Oct. 3	60.97	Aug. 29	60.41

C. R. M'COLLOM LEAVES UNION OIL COMPANY

Effective January 1, C. R. McCollom, chief geologist, Union Oil Co. of California, is resigning his connections with this company to take up duties with another oil organization. Desaix B. Myers, who has been assistant chief geologist for the past four years, has been appointed chief geologist. Mr. McCollom has been with the Union Oil Co. for seven years, starting in 1920 as a geologist and serving as assistant manager of the geological department under Vice President W. W. Orcutt from 1921 until the latter part of 1922, when he was made chief geologist.

PENNSYLVANIA MARKETS

OIL CITY, Pa., Dec. 3.—Gasoline and naphtha continued in good demand in the Pennsylvania refined market during the past week. Kerosene was also about the same as it has been with the demand good. Neutrals were slow. The market for wax was slow and price cuts were made during the period in review. There was practically no demand for fuel oil. Bright stock was also weak. Cylinder stocks were firm holding their own.

PREVENTING ACCIDENTS IN THE OIL INDUSTRY

(Continued from Page 121)

responsibility for the accident is influential in causing all workers to want to avoid accidents. Some of the companies are holding regular courts, hearing the evidence of each accident case, placing the blame upon the person found responsible and frequently recommending discipline.

As the petroleum industry progresses along other lines we must progress in accident prevention methods. Work today is of a specialized nature and men are not being developed by apprenticeship methods which give them a complete experience with all branches of their trade. However we are taking men from their specialized jobs and making them leaders with jurisdiction over various specialized jobs and frequently these men are supervising work regarding which they know very little.

The engineer has his handbook which contains the knowledge and experience of engineers for years, to help him on his new designs. Why should our new foreman in the petroleum industry not have a handbook covering the safe practices of operations of his new job?

For this purpose an engineering committee of four has been organized within the petroleum section of the National Safety Council. Each of these four committeemen now has a large committee gathering data on safe practices in certain operations.

Chief Cause

Handling material is the greatest single cause of accidents in the petroleum industry and as pipe is the principal material used the operation of handling pipe is being made a subject for a safe practices pamphlet. Other subjects being developed are:

Safe Practice — Loading Tank Cars (gasoline).

Safe Practice—Cleaning Stills.

Safe Practice—Service Station Operations.

Safe Practice—Pulling Wells.

Many other subjects have been suggested and will be covered as rapidly as possible.

First a data sheet is prepared on which is outlined in a brief way the proper method of doing each operation in which a worker might be injured. This data sheet is then being expanded into a safe practices pamphlet which fully explains each item. These safe practices pamphlets are being made sufficiently nontechnical that they should be interesting and instructive to any ambitious employe as well as a great assistance to those supervising operations. These safe practices pamphlets when completed for each operation and assembled will constitute a handbook which should be very valuable not only in assisting in preventing accidents but also in increasing operating efficiencies.

An effort has been made in this paper to show that accidents are costly, that they can be prevented, some of the most important methods used in preventing accidents and the present plan of the petroleum section of the National Safety Council.

SIGNAL HILL FIELD STAGES COMEBACK

(Continued from Page 34)

Brayton No. 3 38
Exchange Petroleum Corp., Parker No. 1 39
General Petroleum Corp.:
B. & S. No. 1 40
B. & D. No. 3 41
Boyer Kelly No. 5-B 42
Boyer Kelly No. 6 43
Boyle Perry No. 7 44
Clock No. 4 45
Jonah Jones No. 5 46
K. & H. No. 8 47
Getty, G. F., No. 6 48
Graham & Loftus, Butler No. 1 49
Herwick, Ed R., No. 7 50
Hells, W. (Pan Hellenic), No. 2 (now V. R. G. Wilber) .....
Hope Oil Co., Reidel No. 1 (formerly May & Richards, No. 2) 51
Jergins Syndicate:
Jackson No. 2 52
No. 15 53
No. 22 54
No. 23 55
Johnson, George W.:
Crest No. 3 56
Taylor No. 1 (formerly Rainbow Petroleum, Smith No. 1) 57
MacMillan Petroleum, Campbell No. 1.. 58
McKeon Drilling Co.:
Evans No. 2 59
Thorne No. 1 60
Macrate, No. 1 61
Mack Trust, Bolsa Chica No. 1 62
Maier-Harris, Brayton No. 1 63
Miley, E. J., Mills No. 6 64
O'Donnell, J.:
No. 59 65
No. 62 66
Painted Hills, Merritt No. 2 67
Pan American:
Anderson No. 3 68
Chaney No. 4 69
Rainbow Petroleum Co., No. 12 70
Richfield Oil Co.:
Booth No. 6 128
Booth No. 7 71
Bernstein No. 2-A 72
Booth No. 9 73
Dillman No. 1 130
Freeman No. 2 74
Frye No. 4 75
Green No. 4 76
Green No. 5 77
Haas No. 9 78
Haas No. 14 79
Haas No. 15 80
Haas No. 16 81
Haas No. 17 82
Hoffman No. 1 83
Lang Wall No. 1 84
Malcolm Davis No. 3 85
Rio Grande Oil Co.:
Municipal No. A-2 86
Municipal No. A-3 87
No. B-6 88
Shell Co. of California:
Alamitos No. 24 89
No. 25 90
No. 26 91
No. 27 92
No. 28 93
No. 29 94
No. 30 95
No. 31 96
No. 32 97
Binkley No. 2 98
No. 3 99
Connett No. 1-A 100
Cresson No. 8 101
No. 9 102
No. 11 103
Marcellus No. 2 131
Nesa No. 7 104
Patton Wilson No. 3 105
No. 5 106
Stevenson & Moss, No. 1 107
Stevenson Drilling Co., No. 2 108
Superior Oil:
Britton No. 3 109
No. 4 110
Crew No. 2-A 111
No. 3 112
No. 4 113
Harlan No. 1 127
Harlan No. 2 114
Miller No. 1 115
Swaffield No. 2 116
The Petroleum Co., Nutting Lough No. 2 117
Transport Oil:
Johnson Lindus No. 3 118
No. 4 119
Union Oil:
L. B. Comm No. 3 120
No. 12 121
No. 13 122
No. 16 123
No. 17 124
Wilber, V. R. G.:
No. 1 125
(Helis, W.), No. 2 126

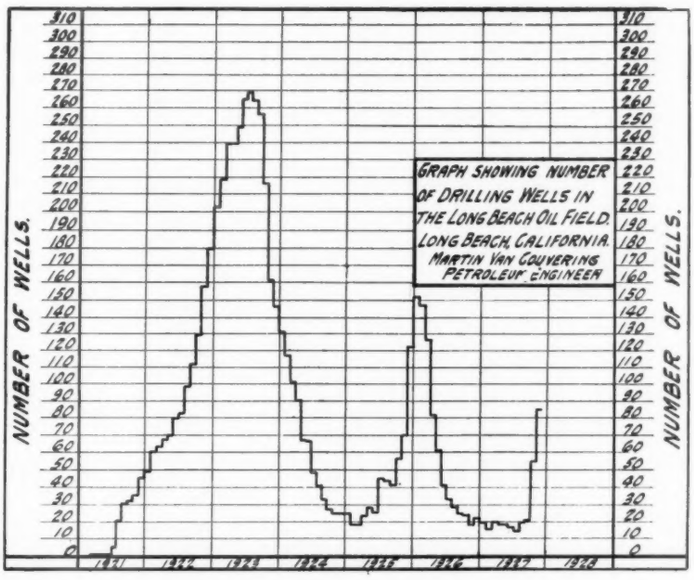
METHOD OF REFINING CRACKED NAPHTHA

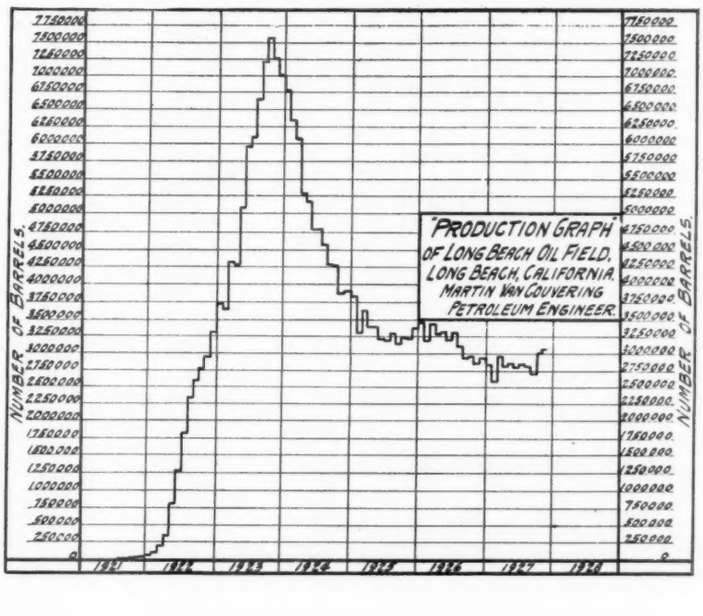
(Continued from Page 36)

effecting a saving in fuel and an increase in factionating efficiency.

A detailed discussion of technical features, of the reaction involved, of yields, and costs is beyond the scope of this paper. Wide variations must be expected with naphthas from different crudes or from different cracking processes. But even this brief description will make apparent the economic significance of the process.

It is possible by this improved treating method to produce cracked gasolines of excellent quality. Constituents of high antidetonating value are conserved, yields are increased, and treating costs are reduced to an extent, which permits the refining of even the more refractory distillates, which cannot be treated profitably by other methods. The process represents a marked advance in the art, therefore, not only from the viewpoint of immediate gains, but also from the broader aspect of conservation of our motor fuel reserves, a consideration which will be of increasing significance in the future.


GRAPH SHOWING NUMBER OF DRILLING WELLS IN THE LONG BEACH OIL FIELD. LONG BEACH, CALIFORNIA. MARTIN VAN COUVERING PETROLEUM ENGINEER
NUMBER OF WELLS.
NUMBER OF WELLS.


"PRODUCTION GRAPH OF LONG BEACH OIL FIELD. LONG BEACH, CALIFORNIA. MARTIN VAN COUVERING PETROLEUM ENGINEER.
NUMBER OF BARRELS.
NUMBER OF BARRELS.

YATES PREVENTION ON DIFFERENT BASIS

(Continued from Page 35)

expected to reach 100,000 bbls. for several months to come.

Water Intrusion

Water intrusion in wells on the east and west side of the Mid-Kansas Oil & Gas Co. and Transcontinental Oil Co.'s No. 2-C Yates, the phenomenal producer of the field, manifested itself late in the week. No. 3-Yates, on the east part of the lease in Section 60, Block 1, had the pay at 1,030 to 1,150 feet and made 77 bbls. per hour, showing 2½ per cent sulphur water. That makes water showing in wells on both sides of the big well of the field.

No. 2-C gauged 2,059 bbls. in 45 minutes on November 15 or at the rate of 2,745 bbls. hourly. When it was opened for its hourly gauge on December 1, the well gauged 2,404 bbls. in one hour, maintaining its lofty position as the biggest gusher ever brought in in the West Texas area. Simms Oil Co. completed a well with an impressive record in No. 3 Smith, Section 103, which flowed 10,000 bbls. in five hours. However, when the well was opened for its hourly gauge it gauged 1,512 bbls. during the test.

When the December 1 potential gauge was taken and indicated a potentially 600,000-bbl. daily pool, many newspapers heralded it as greater than Seminole, which had a peak production of 527,000 bbls. daily. The 600,000-bbl. figure was compared to actual production and the actual pinched in production of Yates is 44,000 bbls. daily.

CALIFORNIA RECEIPTS AND PETROLEUM IMPORTS

Imports of crude and refined oils at the principal United States ports for the week ended November 26 totaled 1,546,000 bbls., a daily average of 220,857 bbls., compared with 1,453,000 bbls., a daily average of 207,572 bbls. for the week ended November 19, and a daily average of 212,714 bbls. for the four weeks ended November 26.

At Atlantic Coast ports:	Nov. 26
Baltimore	152,000
New York	832,000
Philadelphia	234,000
Others	165,000
Total	1,383,000
Daily average	197,571
At Gulf Coast ports:	
New Orleans and Baton Rouge	163,000
Total	163,000
Daily average	23,286
At all United States ports:	
Total	1,546,000
Daily average	220,857
Daily average four weeks	212,714

Receipts of California crude and refined oils at Atlantic and Gulf Coast ports for the week ended November 26 totaled 77,000 bbls., a daily average of 11,000 bbls., against 326,000 bbls., a daily average of 46,571 bbls. for the week ended November 19 and a daily average of 60,964 bb'ls. for the four weeks ended November 26.

At Atlantic Coast ports:	Nov. 26
New York	77,000
Total	77,000
Daily average	11,000
Atlantic and Gulf Coast ports:	
Total	77,000
Daily average	11,000
Daily average four weeks	60,964
Distribution of total California oil receipts is as follows:	
Gasoline	77,000
Total	77,000

BIG WELLS IN PECOS INFLUENCE CRUDE GAIN

(Continued from Page 30)

Kay	13	107	7	3
Muskogee	11	145	8	..
Okfuskee	6	1,365	2	2
Okmulgee	28	179	9	9
Osage	17	2,866	4	4
Payne and Lincoln	7	570	4	2
Pontotoc and Garvin	14	4,923	4	..
Pottawatomie	22	6,771	3	1
Rogers	14	104	6	2
Seminole	129	76,118	29	1
Stephens and Cotton	12	375	7	..
Wagoner	5	....	5	..
Tulsa	8	88	3	1
Miscellaneous	20	178	7	3
Total November	376	98,896	122	42
Total October	410	170,816	125	52
Difference	34	71,920	3	10

Summary of Rigs and Wells Drilling

County—	Rigs	Drg.	Ttl.
Carter	6	17	23
Creek	17	53	70
Garfield	..	19	19
Grady	5	32	37
Grant	2	16	18
Hughes	1	13	14
Kay	5	29	34
Logan	2	23	25
Muskogee and Wagoner	5	35	40
Okfuskee	6	28	34
Okmulgee	9	24	33
Osage	12	45	57
Pawnee	2	13	15
Payne and Lincoln	1	13	14
Pontotoc	10	44	54
Pottawatomie	5	42	47
Seminole	25	220	245
Stephens and Cotton	7	23	30
Tulsa	3	13	16
Miscellaneous	6	68	74
Total November	129	770	899
Total October	125	864	989
Difference	4	94	90

KANSAS FIELDS

Summary of Wells Completed

County—	Comp.	Prod.	Dry	Gas
Anderson	8	233	..	..
Butler	5	200	4	..
Cowley	9	575	3	4
Greenwood	40	4,150	15	1
Labette	9	117	..	3
Montgomery	13	52	4	5
Sumner	28	7,393	8	1
Miscellaneous	25	271	11	2
Total November	137	12,991	45	16
Total October	82	4,540	26	5
Difference	55	8,451	19	11

Summary of Rigs and Wells Drilling

County—	Rigs	Drg.	Ttl.
Butler	4	19	23
Cowley	4	22	26
Elk	3	8	11
Greenwood	16	25	41
Marion	2	9	11
Sumner	11	24	35
Miscellaneous	13	67	80
Total November	53	174	227
Total October	39	178	217
Difference	14	4	10

LOUISIANA-ARKANSAS

NORTH LOUISIANA

Summary of Field Operations

Parish—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Blenville	0	0	0	1	..	..	..
Bossier	7	20	3	3	8	10	18
Caddo	24	3,135*	7	3	27	24	51
Caldwell	1	0	1	0	1	0	1
Catahoula	0	0	0	0	0	4	4
Claiborne	0	0	0	0	1	1	2
DeSo.o	2	15	0	1	6	6	12
Franklin	0	0	0	0	1	2	3
Grant	1	0	1	0	3	0	3
LaSalle	4	75	3	0	4	0	4
Madison	0	0	0	0	1	0	1
Monroe dist.	6	†	1	5	10	8	18
Natchitoches	3	0	3	0	0	1	1
Red River	2	62	0	0	2	0	2
Rapides	0	0	0	0	0	1	1
Richland	6	†	3	2	8	14	22
Sabine	5	1,065	3	0	6	5	11
Webster	3	10	0	2	5	9	14
West Carroll	1	0	1	0	0	2	2
Winn	0	0	0	0	2	1	3
Total	64	4,382	26	16	86	90	176
Total Oct.	55	965	22	26	53	104	157
Difference	9	3,417	4	10	33	14	19

*Two wells also producing gas.

†Gas production: Monroe district, 32,143,000 feet; Bossier, 68,000,000 feet; Caddo, 26,900,000 feet; Richland, 60,126,000 feet; Webster, 37,969,000 feet; total, 225,138,000 feet.

ARKANSAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Ashley	1	0	1	0	0	0	0
Bradley	0	0	0	0	1	0	1
Calhoun	0	0	0	0	0	1	1
Clay	0	0	0	0	1	0	1
Cleveland	0	0	0	0	1	0	1
Columbia	5	0	5	0	1	1	2
Drew	0	0	0	0	1	0	1
Faulkner	0	0	0	0	1	0	1
Franklin	1	*	0	1	0	1	1
Garland	0	0	0	0	0	2	2
Grant	0	0	0	0	1	0	1
Hempstead	0	0	0	0	1	0	1
Jackson	0	0	0	0	1	0	1
LaFayette	0	0	0	0	1	0	1
Lincoln	0	0	0	0	1	0	1
Little River	0	0	0	0	1	0	1
Miller	1	0	1	0	1	1	2
Nevada	4	320	0	0	10	2	12
Ouachita	5	120	3	1	8	3	11
Pike	0	0	0	0	2	0	2
Pope	0	0	0	0	1	0	1
Union	10	1,038	6	1	20	16	36
Woodruff	0	0	0	0	1	0	1
Total	27	1,478	16	3	55	27	82
Total October	27	1,056	12	2	14	29	43
Difference	0	422	4	1	41	2	29

Rigs include locations, derricks, rigs and wells shut down for various causes after starting drilling.

Gas production: Franklin county, 750,000 feet; Ouachita county, 6,000,000 feet; Union county, 6,000,000 feet; total, 12,750,000 feet.

EAST TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Harrison	6	0	2	4	3	6	9
Marion	0	0	0	0	0	1	1
Panola	5	0	0	5	7	5	12
Sabine	0	0	0	0	0	1	1
Shelby	0	0	0	0	0	2	2
Total	11	0	2	9	11	14	25
Total October	14	591	10	0	2	14	16
Difference	3	591	8	9	9	0	9

Rigs: Locations, rigs and wells shut down for various causes.

Gas production: Harrison county, 16,000,000 feet; Panola, 14,062,000,000 feet; total, 30,062,000 feet.

EAST CENTRAL TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Limestone	7	450	3	0	0	4	4
Anderson	1	0	1	0	0	2	2
Smith	1	0	1	0	0	1	1
Cherokee	1	0	0	1	0	1	1
Freestone	0	0	0	0	0	2	2
Total Nov.	10	450	5	1	0	10	10
Total Oct.	13	591	10	0	2	14	16
Difference	3	141	5	1	2	4	6

SOUTHWEST TEXAS

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Mirando	15	105	7	5	4	25	29
Rockdale-Minerva	0	0	0	0	0	4	4
Luling	3	105	0	0	0	2	2
Kingsville	4	0	3	1	1	1	2
Refugio	4	0	0	4	4	6	10
Adams Gas Field	6	0	0	6	2	3	5
Somerset	0	0	0	0	0	0	0
Dale Field	6	15	5	0	2	3	5
*Miscellaneous	16	2	11	4	13	103	116
Total Nov.	54	227	26	20	26	147	173
Total Oct.	57	474	31	10	24	140	164
Difference	3	247	5	10	2	7	9

*Includes White Point gas field.

KENTUCKY-TENNESSEE

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Warren	7	27	4	0	0	9	9
Allen	7	93	4	0	0	12	12
Barren	3	40	0	0	0	19	19
Ohio	43	2,139	17	0	0	49	49
Daviess	7	145	1	0	0	9	9
McLean	0	0	0	0	0	1	1
Hancock	1	0	1	0	1	0	1
Cumberland	0	0	0	0	0	1	1
Clinton	0	0	0	0	0	1	1
Butler	0	0	0	0	0	2	2
Hopkins	0	0	0	0	0	1	1
Edmonson	1	0	1	0	0	0	0
Wayne	3	4	1	0	0	3	3
Estill	13	30	4	0	0	4	4
Lee-Owsley	5	14	2	0	0	0	0
Wolfe	1	3	0	0	0	0	0
Johnson-Magoffin	2	14	0	0	2	5	7
Floyd-Knott	1	0	0	1	0	6	6
Knox	0	0	0	0	0	3	3
Laurel	1	0	1	0	0	0	0
McCreary	0	0	0	0	0	1	1
Clay	1	0	0	1	0	1	1
Kentucky	98	2,509	36	2	3	127	130
Tennessee	0	0	0	0	0	36	36
Alabama	0	0	0	0	0	7	7
Mississippi	0	0	0	0	11	18	29
Florida	0	0	0	0	0	13	13
N. Carolina	0	0	0	0	0	1	1
Total Nov.	98	2,509	36	2	14	202	216
Total Oct.	123	3,499	41	6	17	199	216
Difference	25	990	5	4	3	3	0

GULF COAST FIELDS

	Comp.	Prod.	Dry	Gas	Rig	Dig.	Ttl.
Austin	6	10	3	1	2	3	5
Brazoria	2	500	1	0	0	12	12
Chambers	2	240	1	0	2	8	10
Fort Bend	18	6,074	7	0	3	24	27
Hardin	4	43	0	0	0	7	7
Harris	6	6,965	1	0	7	21	28
Jefferson	14	14,553	0	1	0	21	21
Liberty	6	295	1	0	1	14	15
Matagorda	1	0	1	0	0	3	3
Orange	4	107	1	0	0	11	11
Wharton	12	190	11	0	11	8	19
Misc. (Texas)	8	0	8	0	4	4	8
Calcasieu	6	2,150	1	0	5	17	22
Cameron	2	1,000	1	0	1	3	4
Misc. (La.)	4	0	4	0	3	16	19
Total Nov.	96	32,127	41	2	39	172	211
Total Oct.	89	44,990	37	3	32	139	171
Difference	7	12,863	4	1	7	33	40

ROCKY MOUNTAIN AREA

WYOMING

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Salt Creek	5	2,614	0	0	5	16	21
Big Horn Co.	0	0	0	0	0	6	6
Carbon Co	0	0	0	0	1	12	13
Converse Co.	0	0	0	0	1	4	5
Fremont Co.	1	0	1	0	1	9	10
Goshen Co.	0	0	0	0	0	1	1
Hot Springs-Washakie	2	0	2	0	1	1	2
Hot Spgs. Co.	0	0	0	0	0	5	5
Johnson Co.	0	0	0	0	1	4	5
Natrona Co.	1	180	0	0	0	1	1
Niobrara Co.	0	0	0	0	1	4	5
Park Co.	0	0	0	0	4	25	29
Platte Co.	0	0	0	0	0	2	2
Sweetwater Co.	3	0	3	0	1	9	10
Sublet Co.	4	246	0	0	3	31	34
Uinta Co.	0	0	0	0	0	2	2
Washakie Co.	0	0	0	0	0	3	3
Wes.on Co.	0	0	0	0	1	10	11
Total Nov.	16	3,040	6	0	21	147	168
Total Oct.	26	2,318	2	0	29	136	165
Difference	10	722	4	0	8	11	3

COLORADO

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Total Nov.	15	731	7	2	8	81	89
Total Oct.	12	837	6	0	5	77	82
Difference	3	106	1	2	3	4	7

NEW MEXICO

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Total Nov.	11	138	9	1	5	81	86
Total Oct.	13	150	11	1	15	104	119
Difference	2	12	2	0	10	23	33

UTAH

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Total Nov.	2	0	2	0	2	24	26
Total Oct.	2	0	2	0	1	25	26
Difference	0	0	0	0	1	1	0

MONTANA

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Cat Creek	0	0	0	0	4	4	4
Kevin-Sunburst	32	4,234	11	4	14	24	38
Miscellaneous	16	0	14	2	7	52	59
Total Nov.	48	4,234	25	6	21	80	101
Total Oct.	60	2,190	30	5	19	97	116
Difference	12	2,044	5	1	2	17	15

NORTH AND WEST TEXAS

Summary of Wells Completed

West Texas

County—	Comp.	Prod.	Dry	Gas
Crane	14	7,800	0	0
Crockett	6	1,484	3	0
Fisher	2	0	2	0
Glasscock	2	0	2	8
Howard	12	2,017	3	1
Jones	2	0	2	0
Loving	1	125	0	0
Mitchell	1	0	1	0
Pecos	33	203,159	9	0
Reagan	9	45	0	0
Upton	9	2,328	4	0
Winkler	10	14,144	3	1
Total West Texas	93	231,102	29	2

North Central Texas

County—	Comp.	Prod.	Dry	Gas
Archer	31	225	22	0
Baylor	2	0	2	0
Brown	68	8,054	25	2
Callahan	22	417	14	1
Coleman	7	0	6	1
Cooke	13	235	8	0
Eastland	27	2,411	11	5
Foard	1	0	1	0
Grayson	3	0	2	1
Haskell	2	0	2	0
Jack	27	450	12	0
Knox	2	0	2	0
Montague	16	453	5	1
McCulloch	3	0	2	1
Palo Pinto	8	13	5	0
Shackelford	7	20	5	0
Stephens	7	67	3	1
Throckmorton	5	15	4	0
Wichita	24	376	14	0
Wilbarger	8	596	3	0
Wise	1	0	1	0
Young	26	4,500	11	0
Total North Central Texas	308	17,832	158	13
Grand total North Central and West Texas, Nov.	401	248,934	187	15
Grand total North Central and West Texas, Oct.	263	70,560	110	9
Difference	138	178,374	77	6

NORTH CENTRAL AND WEST TEXAS

Summary of Rigs and Wells Drilling

West Texas

County—	Rigs	Dig.	S.D.	Ttl.
Crane	8	26	4	38
Crockett	3	8	8	19
Howard	7	24	4	35
Jones	3	4	5	12
Mitchell	1	1	1	3
Pecos	48	43	8	99
Reagan	..	6	12	18
Runnels	6	5	1	12
Upton	7	6	3	16
Winkler	20	55	16	91
Miscellaneous counties	12	33	34	79
Total West Texas	115	211	96	422

North Central Texas

County—	Rigs	Dig.	S.D.	Ttl.
Archer	14	17	3	34
Brown	9	34	13	56
Callahan	3	9	7	19
Coleman	9	16	14	35
Cooke	3	11	4	18
Eastland	13	19	10	42
Jack	4	15	6	25
Montague	3	9	2	14
Shackelford	0	7	5	12
Stephens	3	11	7	21
Throckmorton	0	2	1	3
Wichita	13	22	3	38
Wilbarger	11	27	3	41
Young	16	33	6	55
Miscellaneous counties	6	22	32	60
Total North Central Texas	107	254	116	477
Grand total North Central and West Texas, Nov.	222	465	212	899
Grand total North Central and West Texas, Oct.	218	404	228	850
Difference	4	61	16	49

PANHANDLE FIELDS

Summary of Wells Completed

County—	Comp.	Prod.	Dry	Gas
Carson	6	580	0	3
Gray	5	2,677	1	1
Hutchinson	12	705	2	1
King	2	0	2	0
Potter	1	0	0	1
Sherman	1	0	1	0
Wheeler	4	28	1	2
Total Nov.	31	3,990	7	8
Total Oct.	46	10,320	12	14
Difference	15	6,330	5	6

Rigs and Wells Drilling

County—	Rigs	Drg.	S.D.	Ttl.
Carson County	1	5	3	9
Gray County	14	38	6	58
Hutchinson County	6	19	10	35
Wheeler County	6	2	4	12
Miscellaneous County	7	15	32	54
To al Nov.	34	79	55	168
Total Oct.	27	68	81	176
Difference	7	11	26	8

EASTERN FIELDS

Summary of Wells Completed

Field—	Comp.	Prod.	Dry	Gas
Allegany	41	63	0	0
Bradford	115	291	0	0
Middle Field	6	26	0	0
Venango-Clarion	23	17	1	7
Butler-Armstrong	12	3	4	4
Southwest Pennsylvania	27	49	4	18
West Virginia	81	268	22	36
Southeast Ohio	82	927	25	21
Total Nov.	387	1,644	56	86
Total Oct.	358	1,350	34	65
Difference	29	294	22	21

Summary of Work Under Way

Field—	Rigs	Drg.	Ttl.
Allegany	10	32	42
Bradford	16	69	85
Middle Field	0	5	5
Venango-Clarion	2	19	21
Bu.ler-Armstrong	5	9	14
Southwest Pennsylvania	7	26	33
West Virginia	34	136	170
Southeast Ohio	20	84	104
Total Nov. 30	94	380	474
Total Oct. 31	115	373	488
Difference	21	7	14

CENTRAL OHIO

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Knox	2	0	0	2	1	2	3
Ashland	6	0	4	2	8	7	15
Medina	7	36	3	0	1	3	4
Lorain	3	0	3	0	1	4	5
Wayne	3	0	1	2	0	6	6
Holmes	6	15	2	2	2	10	12
Coshocton	2	0	0	2	3	4	7
Cuyahoga	11	5	0	10	1	15	16
Jackson	1	0	0	1	0	0	0
Summitt	1	0	1	0	0	2	2
Muskingum	1	0	1	0	0	0	0
Richland	0	0	0	0	0	1	1
Starker	0	0	0	0	0	2	2
Guernsey	8	0	1	7	0	7	7
Gallia	1	0	0	1	2	1	3
Lawrence	0	0	0	0	0	1	1
Fairfield	1	0	0	1	0	1	1
Total Nov.	53	56	13	33	19	68	87
Total Oct.	36	186	6	24	12	73	85
Difference	17	130	7	9	7	7	0

LIMA FIELDS

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Wood	0	0	0	0	1	3	4
Hancock	2	60	0	0	0	4	4
Allen	2	35	0	0	0	4	4
Auglaize	7	123	1	0	0	6	6
Sandusky	3	33	0	0	0	1	1
Mercer	3	56	0	0	0	4	4
Van Wer.	1	0	1	0	0	2	2
Seneca	0	0	0	0	0	3	3
Lucas	0	0	0	0	0	2	2
Ottawa	0	0	0	0	0	2	2
Shelby	0	0	0	0	0	1	1
Hardin	1	5	0	0	0	2	2
Wyandot	0	0	0	0	0	1	1
Darke	2	27	0	0	0	2	2
Total Nov.	21	339	2	0	4	34	38
Total Oct.	24	318	2	2	3	26	29
Difference	4	21	0	2	1	8	9

INDIANA FIELDS

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Wells	1	0	1	0	0	0	0
Blackford	0	0	0	0	0	2	2
Jay	2	20	1	0	0	4	4
Grant	0	0	0	0	0	2	2
Randolph	0	0	0	0	0	1	1
Huntington	1	25	0	0	0	1	1
Gibson	7	117	3	0	0	6	6
Pike	5	15	2	1	0	1	1
Davies	2	8	1	0	0	8	8
Sullivan	1	100	0	0	0	7	7
Vigo	0	0	0	0	0	7	7
Allen	1	0	0	1	2	2	4
Knox	1	8	0	0	0	1	1
Dubois	0	0	0	0	0	1	1
Benton	0	0	0	0	0	1	1
Johnson	0	0	0	0	3	0	3
Marion	0	0	0	0	0	1	1
Fountain	0	0	0	0	0	1	1
Martin	0	0	0	0	0	3	3

Monroe	0	0	0	0	0	1	1
Spencer	1	12	0	0	0	1	1
Bartholomew	0	0	0	0	0	1	1
Miami	0	0	0	0	0	1	1
White	0	0	0	0	0	1	1
Decatur	1	0	0	1	0	0	0
Montgomery	0	0	0	0	0	1	1
Lagrange	0	0	0	0	0	1	1
Tipton	1	0	1	0	0	0	0
Henry	0	0	0	0	0	1	1
Shelby	1	3	0	0	0	1	1
Wabash	0	0	0	0	0	1	1
Green	0	0	0	0	0	1	1
Harrison	3	0	1	2	0	2	2
Total Nov.	28	308	10	5	5	62	6
Total Oct.	27	370	9	5	10	52	62
Difference	1	62	1	0	5	10	5

ILLINOIS FIELDS

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Clark	4	36	2	0	0	4	4
Cumberland	0	0	0	0	0	2	2
Crawford	6	44	2	0	0	5	5
Lawrence	2	50	0	0	0	6	6
Wabash	7	85	3	0	3	6	6
Morgan	0	0	0	0	0	1	1
Marshall	0	0	0	0	0	1	1
Macon	0	0	0	0	0	1	1
Madison	0	0	0	0	0	2	2
Shelby	0	0	0	0	0	1	1
St. Clair	0	0	0	0	0	1	1
Taswell	0	0	0	0	0	1	1
Total Nov.	19	215	7	0	3	31	34
Total Oct.	15	107	8	1	0	27	27
Difference	4	108	1	1	3	4	7

MICHIGAN FIELDS

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Saginaw	3	80	0	0	0	7	7
Van Buren	1	0	1	0	0	0	0
Shiawassee	0	0	0	0	0	2	2
Livingstone	0	0	0	0	0	1	1
Muskegon	0	0	0	0	0	1	1
Crawford	0	0	0	0	0	1	1
Charlevoix	0	0	0	0	0	1	1
Macomb	0	0	0	0	0	1	1
Midland	0	0	*	0	0	1	1
Roscommons	0	0	0	0	0	1	1
Arenac	0	0	0	0	0	1	1
Sanilac	0	0	0	0	0	1	1
Isabelle	0	0	0	0	0	1	1
Alpena	0	0	0	0	0	1	1
Total Nov.	4	80	1	0	0	20	20
Total Oct.	39	275	16	2	2	21	23
Difference	35	195	15	2	2	1	3

KERN RIVER BONUSES

WASHINGTON, D. C., Dec. 3.—The Government has received $672,000 in bonuses from a recent sale of oil and gas leases in the Kern River oil field in California. The highest bids for units in this sale was the Midland Oil Fields Co., Ltd., at $2,100 per acre. The entire tract contained 120 acres. The highest bidder for another unit containing 160 acres was the Pan American Petroleum Co., which bid $2,625 per acre.

CORROSION DESTROYS REFINERY EQUIPMENT

(Continued from Page 35)

ground at some distance from any tank containing inflammable liquids.

Samples of iron sulphide which had been buried in the ground for a period of six months and were then unearthed and exposed to the air rapidly became so hot by the ensuing oxidation that they took fire. In handling any of the lacquers, varnishes or enamels the manufacturer should be consulted as to the solvents which are used in their product to avoid the possibility of poisoning the painters who are at work on the surface. Adequate ventilation in the tanks being painted must always be provided. It is frequently necessary to allow several days between coats and especially after the last coat, to ensure that the coat is thoroughly dried and set before crude is cut into the tank. Failure to observe this precaution may easily ruin the efficiency of the coating.

Other Methods

There is another method of tackling the problem, consisting in the replacement of the steel roof with one of some metal or alloy which will satisfactorily resist the action of the corrosive agents concerned. Such a method as the spraying on of a protective metal layer, the metal so used being resistant to corrosion, would also seem to have application in this connection in the case that a satisfactory paint or varnish cannot be discovered to take care of the corrosion.

There is, of course, still another way of attacking the general problem of crude storage tank corrosion and this consists essentially in a pretreatment of the crude to remove the corrosive agents. Usually, however, it is found to be inadvisable to attempt this on account of the emulsions which are liable to result when using caustic for example to remove the hydrogen sulphide in such crude. The saving in crude storage tank corrosion consequent upon the reduction would probably not justify the very heavy treating cost which would be incurred by the use of such a process.

Moreover, such a treatment will be of little assistance in the actual refining operation since it will only remove the free hydrogen sulphide and this is a very small fraction of the potential hydrogen sulphide in the crude. The use of wooden roofs, which has been gradually abandoned in favor of those of metal on account of fire hazard from lightning and static electricity, is advocated in some quarters as a corrosion preventive measure. It does not seem to have been adopted on any large scale, however, on account of the fire hazard.

Corrosion in Refining

The corrosion occurring in refining equipment may be considered under three heads.

1. Atmospheric Stills: In stills operating at atmospheric pressure and at temperatures not exceeding 700-750 degrees Fahrenheit, i.e., during the topping operations and when charging stock for cracking units is being made, the corrosion seems to be very largely a function of the amount of magnesium and calcium chlorides as well as of the hydrogen sulphide which is formed by thermal decomposition of compounds in the crude. A comparatively large amount of data have been accumulated on several batteries when running Panhandle (Carson-Hutchinson), Regan and Crane-Upton crudes.

To obtain a measure of the corrosion occurring in the battery when running any given crude it became necessary to develop a technique of analysis to meet the existing conditions. This technique was changed several times during the course of the work as more and more information became available. The method latterly used consisted in taking the water and stream samples and analyzing them for acidity, both that as hydrogen sulphide and as hydrochloric acid, and the amounts of the dissolved and suspended iron to be found in the streams and condensed water. It has been feasible to draw up a theory of corrosion under these conditions which appears to meet the facts of the case. In the absence of any other acid hydrogen sulphide attacks the iron of which the equipment is largely composed, forming iron sulphide. This iron sulphide is dense and coherent and indeed appears to form an actual protective coating on the surface of the iron. In the presence of hydrochloric acid, formed by the hydrolysis of the alkaline earth metal chlorides which were originally present in the crude, however, this iron sulphide is dissolved to form ferrous chloride and hydrogen sulphide which latter is then free to attack more iron and the cycle is repeated. This ferrous chloride is actually found dissolved in the water which comes over with the stream as the result of using steam in the battery.

Suggested Remedies

There are a number of ways in which this corrosion can be minimized or prevented and these will be briefly outlined: (1) Injection into the stills of some basic material to neutralize the hydrochloric acid as fast as this is formed. Caustic and soda both have their application in this connection and have been tried with satisfactory results.

In the following table the results of the use of caustic in the stills are given.

Charging Stock—Crane-Upton Counties

Lbs. Caustic per of Charge	Total HCl Overhead as Lbs. per Hour	Total Fe Lbs. per Hour	Total H_2S in Distillate Lbs./Hour
0	13.1	11.2	90.7
.025	0.9	0.3	101.

This table shows clearly that while the introduction of caustic has considerably cut down both the hydrochloric acid and the iron found in the streams, it has had no effect on the hydrogen sulphide evolution. The maximum amount of corrosion occurs in the last gasoline stills in the battery, corresponding to temperatures of 450 degrees Fahrenheit and above. Thereafter it drops again to a very low value in the water white and gas oil cuts, although the hydrogen sulphide remains quite high for these cuts.

It seems from these and other similar data that once the effect of the hydrochloric acid is neutralized there is nothing to fear from the hydrogen sulphide as a corrosive agent under the conditions of operation of the stills. The use of caustic or other neutralizing agent in the stills rather than in the condenser worms seems to be desirable since in the latter case the streams are always much more dirty. In some quarters it is considered advisable to treat the crude with caustic before charging to the battery. By giving a caustic pretreat and allowing the emulsion so formed to go through all the heat exchange equipment available, it is possible to drop out some of the chlorides and also, by neutralization of organic acids occuring in the crude form oil soluble sodium salts of these acids. These salts, because they dissolve in the crude oil, have very much better contact with the hydrochloric acid and react with it to form sodium chloride, which does not appreciably hydrolyze, and the free organic acids which cause little trouble from the corrosion point of view.

Neutralizing Agent

The second way of minimizing corrosion is to use a neutralizing agent in the worm and overhead equipment to take care of this acid condition which is set up. Ammonia and caustic have been used in this connection with apparently successful results. This method, however, is not as satisfactory as the injection of the base into the stills themselves for the reason given above, although it is not subject to one disadvantage of the latter operation, that of hot bottoms which are always liable to occur when caustic is injected into a still.

Lime, a valuable anticorrosive measure in cracking coil operation, cannot satisfactorily be used here, since it is the hydrolysis of calcium (and magnesium) chloride which gives rise to the corrosive condition which it is desired to correct. In topping operations where nothing heavier than gasoline is being taken off, it is sometimes feasible to run the stills dry. This very noticeably cuts down the rate of corrosion occurring in the battery on account of the fact that there is very little water with which the calcium and magnesium chlorides can react to give hydrochloric acid.

Use of Caustic

In this connection, if any caustic is being used in the stills it should be as concentrated as possible, bearing in mind the difficulty of getting good contact between the caustic and the acid products at very high caustic concentrations. If this is disregarded, a state of affairs will arise such that the added corrosion taking place on account of the water added with the caustic will be greater than the decrease in corrosion consequent upon the introduction of the caustic. Such a result has actually been observed. This method of elimination of water will obviously not apply in cases where a deep cut is being made since in such cases it is necessary to have steam present in order to accomplish the distillation of the heavier products at a reasonably low temperature to avoid having excessive cracking. It would be possible to run without steam in the event that the residuum was to be cracked or that vacuum could be used to replace steam in bringing over the heavier fractions of the cracking stock.

Various methods have been tried from time to time for the elimination of the chlorides which have so large a share in causing the corrosion. In those paraffin crudes the inorganic salts which are present are very much harder to remove than would be the case in the absence of paraffin wax. Around each crystal of salt there appears to be a protective coating of wax and until this is removed there is little or no chance of getting at the salts to remove them from the crude.

Filtration Method

Probably the most satisfactory way of achieving this seems to be by filtration of the crude at a slightly elevated temperature. It is claimed that such a process will almost completely remove the calcium and magnesium chlorides in the crude at a relatively low cost.

Such a process is available, and has the advantage of removing the last traces of water from the crude as well as the chlorides. It is important in using such a process to work at slightly elevated temperature in order that the wax may be melted, thus facilitating removal of the chlorides without unduly plugging the filter. The cost of treatment of the crude by this method should be not more than 1 or 2 cents per barrel, with probably less for large quantities of oil treated.

Neither this method nor any of the other methods which have been mentioned in previous paragraphs has the slightest effect on decreasing the amount of hydrogen sulphide evolved during the distilling operation. All that they do is to remove or neutralize the effect of other acids, thereby rendering the hydrogen sulphide comparatively innocuous as far as corrosion is concerned.

What has been written on crude storage tank corrosion concerning the danger of the spontaneous oxidation of iron sulphide is still true in handling these crudes in refinery operation and the utmost care must be exercised in opening up equipment in which sour crude has been running to avoid fires. This can generally be achieved by the twofold precaution of keeping the iron sulphide wet and of replacing the air by steam until such time as it is feasible to remove the iron sulphide from the equipment.

Other problems of corrosion occur in connection with the operation of atmospheric batteries on sour crudes. Such problems as those of corrosion of the bolts in condenser boxes by the cooling water are troublesome, but since they are not peculiar to the running of sour crudes, they are not treated in this paper.

Rundown Tank Corrosion

The problem of the corrosion of rundown tanks is even more serious and more difficult to handle satisfactorily than that of crude storage tank corrosion. It is attributed to the combined influence of hydrogen sulphide, moisture, oxygen from the air and hydrocarbon vapors although there is also a possibility that other sulphur compounds, either those originally present in the crude or else formed by thermal decomposition of these may be contributory causes to the corrosion which occurs. So rapidly does iron sulphide form on inner surfaces or rundown tanks where sour distillates are being handled that it is necessary to clean them every six weeks to remove this hazard. Protective coatings to take care of this condition are being tried at the present time but the tests have not been going a sufficient length of time to determine whether there is any really satisfactory protective coating on the market. The hazardous condition outlined above can be somewhat aided by using a vapor tight system of tankage operating either under slight pressure or slight vacuum in conjunction with a gas recovery system. By this means oxygen can be excluded from the tanks and so the danger of spontaneous oxidation is lessened.

The iron sulphide, which is formed in rundown tanks, is bulky and loosely adherent in contradistinction to that which is formed in the stills at higher temperatures, where it is dense and very adherent in the absence of hydrochloric acid. This means that corrosion proceeds very much further and more rapidly in rundown tanks than it does in the stills. Probably the only really satisfactory way of guarding against this type of corrosion is by elimination of the source, i.e., removing the hydrogen sulphide before the distillates reach the rundown tanks.

Cracking Equipment

While corrosion in the equipment operating at atmospheric pressure is of great importance yet it would seem that that occurring in the cracking equipment is still more objectionable on account of the fact that due to the high pressure and temperature involved, a comparatively small decrease in wall thickness of the

equipment may set up a condition so hazardous that it is actually necessary to abandon the equipment. Consequently very intensive work has been proceeding along the lines of cracking coil corrosion both with the view determining its cause and also the most satisfactory method for its complete or partial elimination.

Rate of Corrosion

By periodical inspections and actual measurements with delicate instruments of the various parts of the equipment involved in the cracking operation it is possible to determine the rate at which any particular piece of refinery equipment is corroding out. However, while the corrosion is proceeding sufficiently rapid to cause great concern, yet it may take a comparatively long time to determine just exactly where it is occuring most rapidly. Consequently, it is necessary to evolve some means of quickly and accurately evaluating the corrosion occurring in any given cracking unit. It has been found, as the result of a large number of experiments, that if the products formed during the cracking operation are carefully analyzed for iron, it is possible to arrive at an estimate of the rapidity with which any given crude or other charging stock is corroding the equipment in a space of time which is only a fraction of that involved in the method using mechanical measurements.

Furthermore, when we come to compare the results obtained by this method of estimating the corrosion loss with those which can be calculated from the results of the periodical inspections made, we find that there is a really remarkable agreement between them. That is to say, they agree within 10 per cent, or thereabouts, which when we consider the number of operations involved in either method of computation, is very good. We find, as is shown in Table 1, that the iron loss largely shows up in the coke in the soaking drums, very little of it finding its way into the other products of the cracking reaction. The actual distribution of iron in the products is given in the following table:

	Per Cent
Iron from the tubes	10.3
Iron in coke from soakers	85.5
Iron in coke from separators	3.3
Iron in water overhead	0.9
	100.0

These figures are characteristic of those obtained when charging gas oil to the cracking coils. It is seen that a large percentage of all the iron is to be found in the coke from the soaking drums. This is very fortunate, because it is a comparatively simple matter to measure the coke which is formed during the period of time that the soaker is in operation. By sampling each wheelbarrow load of coke withdrawn from the soaker, making a composite of all such samples, and then analyzing this composite for iron, one is able to arrive at a fairly accurate estimate of the actual amount of iron going out of the unit in the soaker. The method of analysis used consists essentially in the ashing down of the sample, using an ordinary combustion furnace for the purpose, dissolving the ash in acid, and then determining the iron gravimetrically.

Coke Formation

We find, among other things, that there is a very close relationship, in our charging stocks, between the amount of coke formed and the amount of corrosion being suffered by the unit. There is linear relationship between coke formation and the total amount of iron found in the coke. It follows from this, of course, that the percentage of iron found in the coke is constant, or sensibly so, the actual figure being about 1.5 per cent. This is true for either crude charges to the coils or for gas oil charges, half of our units running on either type of charge stock.

If a careful examination of the measurements is made, it is found that there are certain places in the furnace where the maximum amount of corrosion is to be found in all cases. These points of maximum corrosion are well defined. At them we find the maximum number of tube replacements necessary. In other places in the furnace, no corrosion whatsoever is suffered.

While the maximum corrosion takes place in the furnaces on all units at about the same points, the corrosion due to crude charges is only about one-half of that due to gas oil. The reason for this is that the crudes charged are sweet while the gas oil is largely from sour crudes.

The method here outlined, then, gives us a method for the quick and accurate determination of the corrosive tendency of any new crude, or of a familiar crude under new conditions of operation. The time consumed in obtaining the data is only necessary for one soaker to fill up and be taken out of service, a matter of a few days, instead of the several months which would have to elapse before the corrosion could have been quantitatively determined by the older methods.

INSTITUTE PLEDGED TO CO-OPERATION

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drilling, conservation, "regulation", and "control" has its genesis in the fact that each individual oil producer has been compelled by the very nature of his undertaking, and the court's decision as above referred to, to go it alone.

Conditions of Operations

In every industry there are problems that relate to the conditions under which the law of supply and demand shall operate. Our problem relates not primarily to the law of supply and demand, but to the conditions under which it operates.

Were there any lack of willingness or eagerness, if you please, on the part of the members of the Marland committee and the American Petroleum Institute, or of the members of the industry itself; were there any lack of diligence or intelligence on the part of the committee; were there any inclination to be recalcitrant, obstructive; were there the faintest desire to disregard the public interest—the case would be entirely different.

Until the oil producers, by and large, are able to reach a common understanding, representing some advance over previous practices; until the persons who must go out, find the oil, and produce it, succeed in reaching a common understanding as to changes in methods under which they can operate—it is perfectly clear that no one, no matter how wise, will be able in a mere bill to change the habits and customs of an industry founded not upon theory, but upon facts and necessity.

If, however, proposals of an impractical nature or in violation of the principles which the industry has been compelled to follow are suggested, our answer to them is not as difficult as it may seem to some. In fact, it will be found—once legislative committees get away from generalization; get away from the obvious disadvantages recited above of the rule of conduct which we have been compelled to follow, and address themselves to the concrete problem (which they must do at some stage in their proceeding)—that we shall have only to lay before these committees the record of our struggle with the facts. In thinking of the various proposals for regulation and control, we can too easily take counsel of our fears; we can too easily forget that the law-making bodies of the United States, on the whole, are made up of sound-thinking, practical-minded men—men who before they act must do what we are compelled to do: face the facts as they are.

Under Clouds and Fogs

This whole problem of conservation has been proceeding under clouds and fogs of generalization. The time has arrived when advocates of action owe it to themselves and to the industry to cease generalization and general charges, and to be clear and concrete in respect to the remedies which they propose. Or, if they be consistent and fair-minded men, they must cease a mere recital of the difficulties which heretofore, and now, have inhered in oil production—they must cease, if they wish to be constructive, giving mere word pictures of waste and extravagance, and must confine their energies to telling us precisely what we ought to do as a practical matter to meet their ideas. They, and we, must sooner or later concede (and the sooner, the better (that there is a clear distinction between declaring a thing to be waste in principle and declaring it to be a waste in practice. The former concerns itself with laying a foundation, an objective, of stating that which is desirable, if attainable. It has no limits except a limit of limitless words. The latter concerns itself with the actual conditions, the facts of the situation, with the very art itself. It finds its limitations in the actual oil fields themselves. No one can contribute much to this situation by merely discussing the former; but anyone who contributes even a little to the development of actual field practice will be entitled to his appropriate immortality.

Road To Co-operation

But suppose worst comes to worst—if I may put it that way—and the committee of which Mr. Marland is chairman, and we ourselves, are quite unable to crystallize the many and conflicting ideas in respect to the use of energy into a universal rule, or rules, of conduct which will meet with the approval of the practical operators of this industry and of the legislative authorities, if necessary. Does that mean that progress in economy and in the intelligent use of energy will be stopped? Most emphatically no! The road of co-operation, although it will not solve the problem completely, will still be open, even if the road to compulsion be found to be one which cannot be traveled. The Federal Oil Conservation Board clearly discerned this fact. In its preliminary report of September 1926, it states on page 25:

"Co-operation within the industry can effect economics all along the line—in development and production, a better balancing of supply to demand, when and where the oil is needed . . . . Co-operation within the industry is recommended in both research and action, in discovering the best practice and in adopting it. Field co-operation between neighboring operators in preserving back pressure and reducing the gas factor is an example of practical conservation, or if it is too late to do this, field co-operation can take the form of building up pressure by artificial means. United and co-ordinated effort is the method recommended."

In another portion of the report the Conservation Board indicates that the doubt as to the legality of co-operative agreements—which has served as an actual, imagined, or pretended barrier to co-operative action—should be removed by appropriate legislation.

Beaty Committee Report

The board of directors of the American Petroleum Institute at Tulsa adopted a resolution adhering in principle to these declarations of the Conservation Board, and appointed a committee, of which Judge Amos L. Beaty of The Texas Company is chairman, to recommend specific legislation which would clear up such doubts as there are on this subject.

Judge Beaty's committee has filed a report.

No doubt favorable action will be taken by the board of directors on this report.

To my mind, our soundest position will consist merely in stating our position in respect to the clarification of the laws relative to combinations, in furnishing information to appropriate committees of Congress, in presenting the facts at public hearings, if any shall be held, and thus placing the ultimate responsibility upon the shoulders of the law-making authorities themselves.

In suggesting that Messrs. Thomas A. O'Donnell, J. Edgar Pew, and W. S. Farish, three past presidents of the American Petroleum Institute—"three recognized leaders, conversant with and representatives of all branches of the oil industry"—serve on the committee, as suggested by Secretary Work in his letter October 12, 1927, our purpose, primarily, was to show an attitude of willingness to confer with representatives of the Government and the mineral section of the American Bar Association. In committing ourselves to discussion, to study, we are not committing ourselves to definite conclusions either as to law or policy. Nothing but good can come from having this committee, or any other fair-minded committee, grapple with the law and the facts of our situation. In fact, it is our duty to continue to co-operate with representatives of state and federal government in the consideration of any problem to which they invite our attention.

Record of Achievement

Notwithstanding what has been said in a critical way about the oil industry it has been thought timely to now state briefly some of the things the industry has accomplished, some of the things it has not done and what it is endeavoring to do:

The American oil industry within 70 years has grown from a single well 69 feet in depth, producing a few barrels of oil per day and representing an investment of less than $2,000, to an industry, which in the United States, is second only to agriculture and the railroads.

Six hundred eighty thousand wells have been drilled between 1858 and 1927.

Today a total of over 320,000 wells have a potential daily production of nearly 3,000,000 bbls of oil. The equipment and facilities in the industry are valued at $11,000,000,000 and more than 1,250,000 people are actively engaged in its operations in addition to 1,500,000 who are directly interested through ownership of royalty or stocks and bonds.

Drilling methods have been steadily improved and productive wells have been completed at depths below 6,000 feet in less time than required to complete the first shallow well in 1859.

Production methods have been improved steadily to the end that a greater proportion of oil in the ground is now brought to the surface and this recovery, even from deeper wells, accomplished in less time than possible under the methods used even a decade ago.

More than 92,000 miles of pile lines have been built for the economical transportation of petroleum in bulk from fields to refiners, to tidewater and to market.

Tankage for the storage of over 800,000,000 bbls. of crude oil and refined products has been erected in the fields, at refineries and at points of market distribution.

The oil stored in this tankage forms a safeguard to the needs of the public and has been protected against deterioration and waste from evaporation by the development and installation of gas-tight roofs and other devices.

Manufacturing Efficiency

More than 330 refineries with a daily capacity of 3,000,000 bbls. of crude oil have been built for the manufacture of finished products for public use.

These products range from the lighter grades of aviation gasoline to residual coke and include the gasolines and distillates which have made possible the development of the automobile industry; gas oils, the base material from which homes are heated and lighted; fuel oil which has revolutionized marine transportation, made possible the cheap operation of railway service in territory barren of other fuel, and through the Diesel engine, reduced the cost of power developed in stationary plants; lubricating oils and greases of hundreds of grades and uses; medicinal oils; paraffin wax for candles; asphalt for road surfacing and roofing.

Improvement in refining methods and the development of the "cracking process" has increased the gasoline output resulting from treatment of crude oil.

New methods of treating natural gas have resulted in a saving of gasoline content and made available dry gas suitable and economical for industrial and domestic use; and where such markets are not available the dry gases are now saved and worked over into useful commodities or returned under pressure to the oil producing horizons beneath the

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INSTITUTE ADOPTS ACTIVE PLATFORM

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three to study the work of the Oil Heating Institute and to make recommendations to the executive committee concerning the indorsement of the work of the Oil Heating Institute and appointing three representatives of the American Petroleum Institute to the board of councillors of the Oil Heating Institute.

Board of Councillors

At the general session of the convention held Tuesday afternoon, unanimous approval was given the selection of the board of councillors for nominations for the board of directors, and the following were elected without a dissenting vote to fill vacancies caused by expirations:

Production Group: Pacific Coast—M. L. Requa, San Francisco. Rocky Mountain—B. B. Brooks, Consolidated Royalty Oil Co., Casper, Wyo. Central United States—W. C. Franklin, Tidal Oil Co., Tulsa, Okla.; Frank Phillips, Phillips Petroleum Co., Bartlesville, Okla.; J. Edgar Pew, Sun Oil Co., Dallas, Tex.; H. V. Foster, Indian Territory Illuminating Oil Co., Bartlesville, Okla.

Transportation group: Tank cars—L. J. Drake, Union Tank Car Co., Chicago.

National gas group: N. C. McGowen, Palmer Corp., Shreveport, La.

Natural gasoline (casinghead) group: D. E. Buchanan, Chestnut & Smith Corp., Tulsa, Okla.

Foreign trade group: Herbert L. Pratt, Standard Oil Co. of New York, New York; E. L. Doheny, Pan American Petroleum Co., Los Angeles, Calif.

At-large group: J. F. Lucey, Lucey Petroleum Co., Dallas, Tex.; G. H. Jones, Standard Oil Co. of New Jersey, New York; Wallace Pratt, Humble Oil & Refining Co., Houston, Tex.; T. A. O'Donnell, California Petroleum Corp., Los Angeles, Calif.; W. N. Davis, Phillips Petroleum Co., Bartlesville, Okla.; E. B. Reeser, Barnsdall Corp., Tulsa, Okla.; H. F. Sinclair, Sinclair Consolidated Oil Corp., New York; George S. Davison, Gulf Oil Corp., Pittsburgh, Pa.; J. W. Van Dyke, Atlantic Refining Co., Philadelphia, Pa.; H. L. Doherty, H. L. Doherty & Co., New York; R. C. Holmes, The Texas Company, New York.

Eastern United States: O. D. Donnell, Ohio Oil Co., Findlay, Ohio.

Manufacturing group: Pacific Coast—E. W. Clark, Union Oil Co. of California, Los Angeles, Calif. Rocky Mountain—T. A. Dines, Midwest Refining Co., Denver, Colo.; Central United States—P. M. Miskell, Empire Refineries, Inc., Tulsa, Okla.; John L. Gray, Shaffer Oil & Refining Co., Tulsa, Okla. Eastern United States—Charles L. Suhr, Pennzoil Co., Oil City, Pa.

Distribution group: Rocky Mountain—E. T. Wilson, Continental Oil Co., Denver, Colo. Central United States—H. B. Earhart, White Star Refining Co., Detroit, Mich. Eastern United States—A. P. Coombe, Standard Oil Co. of Ohio, Cleveland, Ohio.

The board of directors amended the constitution changing the number of directors from 60 to 61 and elected the following as directors: L. V. Nicholas, president National Petroleum Marketers Association; W. S. Fitzpatrick, chairman of the board Prairie Oil & Gas Co.; W. N. Irish, Atlantic Refining Co.; John F. O'Donohue, president Texas division, Mid-Continent Oil and Gas Association.

Doherty Pledges Support

Any feeling that Henry L. Doherty might not support efforts being made by the American Petroleum Institute to solve problems confronting the industry was dissipated upon the receipt by E. W. Clark, president of the institute, of a telegram from Mr. Doherty in which the latter pledged his support to any plan giving promise of solving the problem of conserving the national oil resources. The telegram sent Monday from Battle Creek, Mich., where Mr. Doherty is seeking to regain his health, follows:

"I have spent most of the day talking over the oil situation with Mark L. Requa and Earl Oliver. They have given me a vastly different picture from what I have received from newspaper clippings and if they are right, and I hope they are, I am sorry that I made any protest to Work or that I again threatened to go outside of the industry to try to get results. I could only interpret the appointment of my three most vigorous opponents as meaning that the oil industry wanted to continue to block any change in our present methods and that we would have to go through another long period of being told what we could not do.

"I am willing now, as I have been at all times, to sink my own personality and my own views and accept other plans than my own if it will bring about the conservation of the nation's oil resources and the betterment of the conditions in the industry. I am sorry, however, that someone did not keep me better posted on what was going on but regardless of this if anybody can find a solution to our problems other than the ones I have advocated, I am ready to support them."

Yocum Succeeds Welliver

Trell W. Yocum was selected as director of public relations of the institute at a meeting of the public relations committee. He succeeds Judson C. Welliver, who resigned some time ago to accept another position. Mr. Yocum has been connected with the publicity work of the institute for the past three years. The institute plans a greatly enlarged program of publicity during the coming year.

Automotive Equipment

That cities are rapidly taking the matter of automotive transportation equipment into their own hands with the result that many regulations injurious to the oil industry are almost certain was the conclusion reached at the session of the automotive transportation committee, of which Dr. R. T. Anderson is chairman.

The oil industry has been slow in realizing the situation and must act quickly, it was brought out at the meeting. As a result it was decided to organize regional committees to study the situation in the principal territories with the idea of determining what type of equipment is best suited to each. That the type of equipment most practical varies greatly in different parts of the country was emphasized, and this was the determining factor in deciding upon the regional plan of action. Under the regional plan as outlined a committee will be organized for each of three general territories: (1) The Atlantic seaboard; (2) the Middle West, Southwest and Rocky Mountain district; and (3) the Pacific Coast. The foregoing is regarded, however, merely as a skeleton around which a larger organization is expected to be built.

The program of activity for 1928 was also discussed and included the sending out of a questionnaire to all oil companies using automotive equipment covering a list of articles of automotive equipment about which they have had trouble, what should be carried on various sizes of chassis and other pertinent matters.

J. H. Winchester, head of the motor transport division of the Standard Oil Co. of New Jersey, stated that more money is spent by the oil industry for automotive equipment than by any other industry, and that 45 per cent of the industry's quota is used by the marketing division. He stressed the importance of the equipment situation as justifying the most exhaustive study to determine the best and safest equipment available. It was brought out during the evening that there has been considerable agitation recently for a national automotive transportation organization for the oil industry. One of the first organizations of this kind is the Petroleum Motor Transportation Association, with headquarters at Tulsa, which, however, covers only the production end of the oil business.

Two leading aims of the automotive equipment branch of the industry should be education and standardization, according to one of the speakers at the session.

Standardization

Progress was reported from the ten committees on standardization. Some of these committees completed their work. Final specifications were adopted by the committee on wire rope and manila cordage. The large group order on master gauges for rotary drilling taper joints was completed and formal order closed. It is expected that the line pipe specifications will be completed at this meeting. Final specifications were completed on steel tanks for oil storage. Final specifications also were completed on working barrel parts.

The work on the codes of recommended field practice was greatly advanced in all the standardization committees and it is hoped to have several of these codes completed for distribution during the coming year.

The committee on uniform accounting unanimously adopted the form of published income and surplus analysis which will be presented to the board of directors.

The meeting of the general committee on fire prevention was devoted to reports of committees and to a discussion of proposed regulations and good practice statements dealing with the construction and operations of gasoline tank trucks, the safe loading and discharge of oil tankers, and the protection of tanks against lightning.

Vapor Pressure Committee

The meeting of the vapor pressure committee was devoted to a discussion of comparative results on the present bureau of explosives method for determining the vapor pressure of gasoline and the method recently devised by C. P. Beistle, chief chemist of the bureau. The Beistle method gives substantially the true vapor pressure of gasoline while the method now in use does not, but there was difference of opinion as to the desirability of changing from the present well-established method. It was decided finally that the committee should investigate the possibility of using the A.S.T.M. distillation test as a substitute for vapor pressure in classifying gasoline for transportation purposes.

A suggestion that the motion picture film of "The Petroleum Industry" shown for the first time at the convention here, receive the widest possible distribution was made following the showing of the picture, which was accorded widespread praise. The film was produced by the United States Bureau of Mines in conjunction with the institute, which appropriated $25,000 for the purpose. It showed all phases of the oil industry from production to marketing, in an exceptionally simple and clear manner.

Corrosion Problems To Be Discussed by Oil Field Engineers

FORT WORTH, Tex., Dec. 3.—The first meeting of the newly organized Texas-Louisiana section of the American Institute of Mining and Metallurgical Engineers will be held in Fort Worth December 15, according to E. O. Bennett of the Marland Oil Co. of Texas, who is chairman of the section.

"Combating and Preventing Corrosion" will be one of the subjects of discussion. "Efficient Well Pumping Equipment" and "Repressuring Flush Production" are timely and important topics which will also be brought before the meeting. Some attention will also be given to "Cementing Off Bottom Hole Water."

The subject of preventing corrosion is especially important in West Texas and the Panhandle losses due to this factor are extraordinarily large. It is estimated that corrosion caused by hydrogen sulphide gas is costing operators in West Texas alone about $1,000,000 a year and it is believed that much of this can be prevented. Tanks which have been subjected to the corrosive effects of this gas are rapidly going out, and in some cases tubing in gas lift wells has been consumed at the rate of five or six joints a day. Drilling lines suffer to such an extent that they sometimes are taken out of the hole in short pieces after they have been left in contact with the gas for several days, due to fishing jobs and the like. Casing, too, has been eaten out in six weeks' time, while other drilling equipment, pipe lines, storage tanks, flow tanks and the like have been damaged seriously.

SOUTHEASTERN OHIO PRODUCERS' SESSION

LOGAN, Ohio, Dec. 3.—Oil and gas producers of southeastern Ohio gathered here for the second annual meeting of the Southeastern Ohio Oil & Gas Producers Association. W. H. Thompson, Columbus, secretary of the Ohio Oil & Gas Association, spoke in place of George White, Marietta, unable to return from New York. Eighty-five attended.

A. D. Hufford, president, briefly sketched the work of the association for the year. Mentioning the loss of Harry H. Watson from the board of directors, he asked the members to stand silently for a minute as a tribute to his memory.

The marketing end is being considered by the committee headed by D. D. Atha.

President Hufford stated that the only solution of the marketing question in the southeastern Ohio district seemed to be for that district to take care of its own production. This brought out that progress is being made on the proposed refinery. The financing was said to be in good condition and the speaker seemed much encouraged.

Harry Barber, deal of oil men present, urged that efforts be made to knock off the differential as the oil produced in this field was as good as that produced elsewhere where the differential is not levied.

Confidence was shown in the officers and directors through their re-election for a second year. The only change was the election of Fred Stover, New Matamoras, to take the place made vacant by the death of Harry H. Watson. The officers and directors are: A. D. Hufford, Bremen, president; H. D. Atha, Logan, and O. C. Dunn, Marietta, vice presidents; W. L. Franks, Logan, secretary-treasurer; Fred Stover, New Matamoros; A. E. Faine, New Straitsville; Alex Le Croix, Lansaster; C. H. Bell, Logan; Warren E. Burns, Marietta; E. J. Mildren, Marietta; F. W. Douglass, Woodsfield, and H. E. Stewart, Colum-

CALIFORNIA MARKETS ARE HOLDING UP WELL

LOS ANGELES, Calif., Dec. 3.—Consumption of U. S. Motor gasoline in the domestic market is holding up very well. This is in part due to continued sunshiny weather. This sustained heavy demand has brought about a strengthening in prices, U. S. Motor now being sold at from 8½ to 9 cents without state tax.

Indications are that retail prices are likely to hold up during the winter. While statistics just released by the U. S. Bureau of Mines covering October show that consumption of natural gasoline has again caught up with production, this market is again showing weakness. Prices have eased off and are now ranging from 8½ to 9 cents. This is due almost entirely to the increased production in Signal Hill coming from the large volumes of gas in the new deep zone. Natural gasoline manufacturers at Long Beach are enjoying a decided increase in production which they are finding rather hard to move. As a result, prices are on the down trend.

Figures for October show that daily average production was 33,380 bbls., a decrease of 308 bbls. per day under September. Consumption on the other hand was 33,397 bbls. per day, an increase over September of close to 2,000 bbls. daily. For October, daily average utilization was 17 bbls. more than daily average production. Stocks of natural gasoline at the end of October amounted to 782,485 bbls., approximately 23½ days' supply at the current rate of utilization.

Shipments to the Atlantic Seaboard fell off very decidedly. Only 182,424 bbls., which was all fuel oil, moved in this trade. Atlantic foreign shipments were also less, totaling 189,765 bbls., which was also fuel oil. Pacific foreign shipments on the other hand showed a large increase over the previous week, totaling 845,953 bbls. This, too, was fuel oil. Fuel oil is moving very satisfactorily from California.

GOVERNMENT FAILS IN PATENT CLUB CASE

(Continued from Page 31)

It was also charged by the Government that certain licenses made by the Standard Oil Co. of Indiana to refiners to use its patented process, were in restraint of trade because they prohibited the licensee from shipping the gasoline made by the cracking process into that company's retail marketing territory. The Master finds that the patents, which were licensed, were valid and that there was nothing unlawful in such agreements.

It was also charged by the Government that the patent-owning defendants had conspired with the M. W. Kellogg company to put out of business a certain so-called Fleming process for producing cracked gasoline. The Master finds that the evidence shows that the Fleming company largely went out of business because its process was inefficient, dangerous and an infringement on the patents owned by the other defendants.

Summary

In summing up his findings, the Special Master reported: "Neither the defendants, nor any of them, have monopolized or attempted to monopolize, or combine, or conspire with any other person or persons to monopolize any part of the trade or commerce among the several states or with foreign nations."

"Neither defendants, nor any or either of them, have entered into any contract, combination in the form of a trust, or otherwise, or conspiracy in restraint of trade or commerce with any of the states or foreign nations."

"The defendants have not pooled or combined or united the ownership or control of patents belonging to them severally and respectively relating to the art of producing gasoline by cracking processes."

EXCELLENT RECORD OF CHURCH FIELDS POOL

(Continued from Page 32)

No. 6, 1 per cent water and 3 per cent b. s.; No. 7, 8 per cent water and 5 per cent b. s.

The Petroleum Rectifying Co. of California has installed a treating plant on this lease and is treating the oil for a certain fixed royalty. The cost is 1 cent per barrel for the first 100,000 bbls, ¾ of a cent per barrel for the next 100,000 bbls., and ½ cent for all over 200,000 bbls.

The best well in Crane County is Landreth Production Corp.'s No. 11 State-Cowden-Anderson. This well came in August 9, this year, and during its first 100 days averaged 7,160 bbls. daily or 298 bbls. an hour. Its peak was reached on August 12 when it tanked 8,996 bbls. and on December 1 it was still flowing 6,829 bbls. daily, or just about one-half the total output of Landreth's 16 wells.

EVALUATION OF WIRE ROPE CASING LINES

(Continued from Page 37)

10-day period of service of the same line, rendered while continuous coring and reaming was in progress at a greater depth, is shown below:

Drill pipe used: 5⅝-inch, 25.2-pound A.P.I.

Calculation of work in ton-miles.

Date 1927	No. of Round Trips	Average Depth-Feet	Ton-miles per Round Trip	Ton-miles for Day
April 27	5½	3,150	30.0	165.0
April 28	3½	3,175	30.5	106.7
April 29	4½	3,215	31.2	140.8
April 30	5	3,265	32.1	160.5
May 1	4½	3,310	33.0	148.5
May 2	4	3,350	33.6	134.4
May 3	3½	3,380	34.2	120.0
May 4	4½	3,420	35.0	157.5
May 5	4½	3,455	35.6	160.0
May 6	3	3,480	36.1	108.3
Total Ton-miles of service for 10-day period				1,401.7

By comparison with the first 10-day period above, it will be noted that during the last 10-day period the line transmitted almost 10 times as much work to raise and lower the drill-pipe, elevators, blocks and hook. The futility of an attempt to use "days of service" as a basis of comparison is clearly evident.

Cost Per Ton-Mile is Basis of Service Comparisons

Let it be assumed that the above line was 2,500-foot plow steel casing line which cost 25 cents per foot or $625 for the whole length. Assume that the total service rendered or work transmitted by the line prior to its removal was 3,125 ton-miles. Then the cost per ton-mile of the service rendered by this particular line can be evaluated in terms of cents per ton-mile as follows:

$$\text{Cost per ton-mile of service rendered} = \frac{\text{Cost of Line}}{\text{Ton-Miles Service}} = \frac{\$625.00}{3,125} = \$0.20$$

or 20 cents per ton-mile. Thus a method is developed to compare the practical values of various wire rope casing lines on the basis of the cost of the service rendered.

Complete service data which should be taken during the run of the line in the field are as follows:

Well at which line is installed.
Date line is installed.
Depths drilled, from ——— to ———
Total number of round trips of drill pipe.
Size of drill pipe hoisted and lowered.
Number of lines strung in blocks.
Diameter of draw-works drum.
Type of crown block and sheave diameters.
Type of traveling block and sheave diameters.
Ton-miles of service rendered.
Cost per ton-mile of service rendered.

In drilling deep wells it is often considered economy to purchase long lines, say 2,500 feet in length. These are spooled on the draw-works hoist so that about one layer and four wraps are on the drum when the blocks are at lowest position, the blocks are strung up, and the balance of the line is kept spooled in reverse on the calf-wheel. (This latter serves to store the extra line conveniently and to give an emergency means of hoisting in case the rotary drilling engine should fail.) After the section of the line nearest the drum becomes crushed and wickered (usually from 300 to 800 feet), it is cut off and removed, and an equal amount is spooled off of the calf-wheel hoist, through the blocks and onto the drum. It is advisable to so arrange the service records that data on each section of long lines can be segregated. The same suggestion applies when one line is used at two or more wells.

NATURAL GASOLINE OPERATORS MEET

(Continued from Page 31)

cient co-operation between field men and office men. In order to avoid errors the Lone Star company recently revised its method of recording changing in orifice plates.

Whenever such a change is made the field men fill out a card prepared for that purpose. When completely filled out that card will give complete information about the change in the orifice plate even down to the hour and minute of the change. The card is then sent into the office where it is recorded and checked against other records on file.

Every two months the company makes a complete inspection of meters and checks the orifice serial numbers at the same time. In discussing the proper set-up for orifice meters he pointed out that bends in the line cause the gas to swirl and cause a low measurement. It was brought out during the meeting that the American Gas Association is investigating four questions as the most important factors disturbing measurements and regulation at the present time, and their results will be of value to plant oper-

SLIGHT DECREASE IN REFINERY RUNS

(Continued from Page 38)

REFINERY OPERATIONS IN KANSAS—(Cont'nued)
(Plants which have been in operation during the past year.)

Name and Location—	Daily Capacity	Runs Dec. 1	Runs Nov. 1
Standard Oil Co. of Kansas, Neodesha	12,000	7,500	9,000
Vickers Petroleum Co., Potwin	3,500	2,000	1,900
White Eagle Oil & Refining Co., Augusta	8,000	5,500	5,500
West Missouri Group—			
Alliance Rubber Producing Co., Centropolis	2,000	Shut down	Shut down
Wilhoit Refining Co., Joplin	1,500	1,000	1,000
Total	133,500	84,700	89,000

REFINERY OPERATIONS IN NORTH CENTRAL TEXAS
(Plants which have been in operation during the past year)

Name and Location—	Daily Capacity	Runs Dec. 1	Runs Nov. 1
Amarillo Producers & Refiners Corp., Isom	2,000	1,000	1,000
Amarillo Refining Co., Amarillo	5,000	2,900	3,000
American Refining Co., Wichita Falls	7,000	2,700	2,700
Anderson & Prichard Oil Corp. (Western), Wichita Falls	1,500	Shut down	Shut down
Col-Tex Refining Co., Colorado	10,000	6,500	6,500
Continental Oil Co., Wichita Falls	6,000	3,600	4,000
Dale Oil & Refining Co., Electra	2,500	1,200	1,750
Empire Oil & Refining Co., Gainesville	5,000	4,000	4,000
Falls Refining Co., Wichita Falls	1,500	600	1,000
Gulf Refining Co., Fort Worth	10,000	7,100	7,500
Hagaman Refining Co., Tiffin	2,000	100	100
Humble Oil & Refining Co., Burkburnett	4,000	Shut down	Shut down
Humble Oil & Refining Co., McCamey	10,000	11,000	10,000
Iowa Park Producing & Refining Co., Iowa Park	2,500	900	900
Kent-Middleton Refining Co., Angus	4,000	1,200	1,400
Kent-Middleton Refining Co., Minerva	2,500	1,000	1,200
Macmillan Petroleum Co., Isom	4,500	4,000	4,100
Magnolia Petroleum Co., Fort Worth	12,000	5,400	5,500
Magnolia Petroleum Co., Corsicana	4,000	3,200	5,200
Noble Oil & Gas Co., Burkburnett	4,500	3,700	2,800
Olney Oil & Refining Co., Olney	1,500	1,500	1,500
Oriental Refining Co., Dallas	5,000	Shut down	Shut down
*Oriental Refining Co., (Trinity), Dallas	5,000	2,500	3,500
Orient Petroleum Co., Wichita Falls	4,000	750	900
Panhandle Refining Co., Wichita Falls	4,000	3,500	3,800
Phillips Petroleum Co., Isom	2,000	1,600	1,600
Primrose Refining Co., Wichita Falls	1,500	Shut down	Shut down
Primtex Refining Co., Grand Prairie	2,500	Shut down	350
San Angelo Refining Co., San Angelo	1,500	1,500	900
Simms Oil Co., Dallas	5,000	4,100	4,100
Star Refining & Producing Co., Fort Worth	1,800	Shut down	Shut down
Swastika Refining Co., Muenster	1,000	Shut down	350
The Texas Company, Dallas	15,000	10,000	10,000
Tidal Western Refining Co., Burkburnett	3,000	2,000	2,000
Texas Pacific Coal & Oil Co., Fort Worth	6,000	2,500	2,800
Transcontinental Oil Co., Fort Worth	5,000	3,000	3,000
Waggoner Refining Co., Electra	3,400	2,700	2,700
White Eagle Oil & Refining Co., Fort Worth	4,000	Shut down	Shut down
Valley Refining Co., Wichita Falls	2,500	1,700	2,000
Total	174,200	97,250	99,950

*Operated by Magnolia Petroleum Co.

TYPICAL WIRE ROPE CASING LINE STRAND CONSTRUCTIONS

EACH ROPE COMPOSED OF 6 SIMILAR STRANDS OVER MANILA OR WIRE CORES.
(Usual Practice is to make whole rope Right Lay, and individual strands Left Lay.)

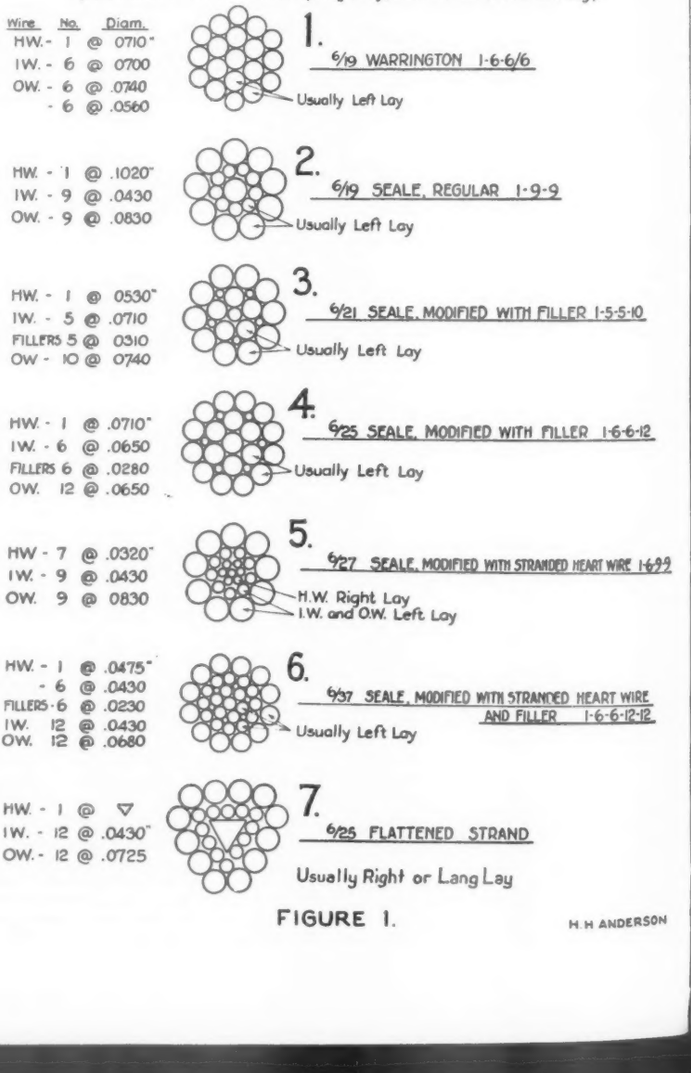

Wire No. Diam.
HW. - 1 @ 0710"
IW. - 6 @ 0700
OW. - 6 @ .0740
- 6 @ .0560
1.
6/19 WARRINGTON 1-6-6/6
Usually Left Lay
HW. - 1 @ .1020"
IW. - 9 @ .0430
OW. - 9 @ .0830
2.
6/19 SEALE, REGULAR 1-9-9
Usually Left Lay
HW. - 1 @ 0530"
IW. - 5 @ .0710
FILLERS 5 @ 0310
OW - 10 @ 0740
3.
6/21 SEALE, MODIFIED WITH FILLER 1-5-5-10
Usually Left Lay
HW. - 1 @ .0710"
IW. - 6 @ .0650
FILLERS 6 @ .0280
OW. 12 @ .0650
4.
6/25 SEALE, MODIFIED WITH FILLER 1-6-6-12
Usually Left Lay
HW - 7 @ .0320"
IW. - 9 @ .0430
OW. 9 @ 0830
5.
6/27 SEALE, MODIFIED WITH STRANDED HEART WIRE 1-6/9/9
H.W. Right Lay
I.W. and O.W. Left Lay
HW. - 1 @ .0475"
- 6 @ .0430
FILLERS 6 @ .0230
IW. 12 @ .0430
OW. 12 @ .0680
6.
6/37 SEALE, MODIFIED WITH STRANDED HEART WIRE AND FILLER 1-6-6-12-12
Usually Left Lay
HW. - 1 @ ▽
IW. - 12 @ .0430"
OW. - 12 @ .0725
7.
6/25 FLATTENED STRAND
Usually Right or Lang Lay

FIGURE 1. H. H ANDERSON

ators. They are as follows: The proper set-up of orifice meters; surging flow through an orifice meter; the effect of changes of density on orifice meter coefficients and the proper selection and use of regulators. Several of the plant operators spent the afternoon in the field with Mr. Sillers studying individual problems.

A paper on "Plant Safety in Natural Gasoline Plants" was delivered by C. L. Hightower, safety director, Texas Pacific Coal & Oil Co., at the opening of the afternoon session. His paper dealt with the numerous causes of accidents in the plant and gave suggestions to remedy the causes.

The tenor of his paper for cleaner plants with its resultant building up of pride in work among employes and thereby creating greater safety measures. During the discussion that followed a multitude of causes of minor accidents were discussed and remedies to eliminate them were discussed. Semitechnical discussions on the hazards and their causes in the loading and unloading of gasoline consumed some time. Along that line, however, nothing was brought to light that an operator of a small plant could use economically.

Plant Operations

Speaking on "General Plant Operations" C. M. Edwards, district superintendent of the Chestnut & Smith Corp. at Ranger, covered his subject in a broad manner. He stressed the importance of special attention to boilers especially in areas where bad water conditions exist. It was his experience that frequent cleaning of the boilers with good treated water obtained the best results.

Proper lubrication of engines was another point stressed. Crank cases should be drained every 60 days and air filters should be used, he added. Considerable grief to the plant operator can be eliminated by properly packing and lubricating pumps which can be more economically done during idle hours of the equipment.

In a "Message to Plant Operators" Otto Peters of Breckenridge urged the operators to elevate the standard of personnel of plant employes. One of the requirements of a successful plant operator must be the ability to handle men, he said. The plant operator should go farther than confining himself to plant problems alone and should be able to take care of any situation arising outside of the plant that might affect the good will of the company he represents. The domineering plant operator has been relegated to the past and in his place a leader of men is rising, he said. Through successful leadership greater service will be obtained from the employes.

F. R. Staley, chief chemist, Texas Pacific Coal & Oil Co., told the operators the treating of gasoline was an individual problem and to meet the problem it is necessary to carry out considerable experimental work and to maintain strict laboratory control after the methods have been applied to plant operation. With careful laboratory control it is possible to maintain a minimum cost of treating he said.

In a technical paper he discussed various methods of treating gasoline. In explaining part of his paper he said some operators had a tendency to use too much sulphur.

Temperature Control

T. G. Laney, Tulsa, Okla., said during his address on "Application of Regulators and Temperature Controls in Gasoline Plant Operations" West Texas gases are proving highly corrosive to the copper in regulators. Gases of high temperature are highly corrosive to the regulators while those of low temperature are the least corrosive.

In buying a regulator, he said, the common error was to pay too much attention to the size of the pipe and not enough attention is given to the volume of gas to go through the pipe. He told the operators it was not worth while to lubricate the bearings in regulators because there was no need for it and the oil served to collect dust. He advised the members present to take the packing out of the stuffing box, lubricate it and make it pliable.

Before installing a regulator he advised the operators to blow the line thoroughly to remove foreign matter. He concluded his address in relating the constant effort on the part of manufacturers to improve regulators and the remarkable improvement that has been made in that equipment during the past few years.

Prior to adjournment A. V. Bourque, secretary of the association, expressed his gratification for the attendance and the interest shown in the meeting.

The meeting was held in the city hall at Breckenridge and Dr. E. R. Lederer, vice president, in charge of refining, Texas Pacific Coal & Oil Co., presided. A barbecue lunch was served at the Brooks & Hanlon plant just outside of Breckenridge by the association.

INSTITUTE IS PLEDGED TO CO-OPERATION

(Continued from Page 150)

surface of the ground to either again bring more oil to the surface or be stored in the sands, reproducing thereby as nearly as possible the original condition that existed prior to the time the drill first penetrated the oil measures.

Always Supplied Demand

For coastwise and foreign transportation of petroleum about 400 tankers with a total capacity of over 20,000,000 bbls. are now operated by American companies, and through bunkering stations, fuel oil for ships is made available at every important port in the paths of ocean travel.

Finally through the use of over 150,000 tank cars and a much larger fleet of tank trucks, petroleum products have been distributed and made available to every American citizen at moderate and fairly uniform prices.

The American oil industry has at all times met and supplied the demand for petroleum products.

This demand, due to the remarkable growth in the industrial development of the country, has increased over ten times since the introduction of the automobile and more than doubled since war; and, furthermore, the industry was notably successful in furnishing the extraordinary demands of war for both industrial and military use.

Petroleum engineering introduced modern practices in many areas and quite extensively in California. By 1926 a great many economies had been effected both in drilling methods and production operations, some outstanding results being obtained in proper shut-off and conservation of gas in the structures.

The very rapid development and application of the air lift principles to the oil well, by the use of air or gas, has demonstrated what research in this direction can accomplish. It also suggests the probability of profitable application to partially depleted areas at a time when oil is needed. At such times, and in such areas, we no doubt will reap the real harvest from the application of these improved methods.

What the Oil Industry Has Not Done

The American oil industry has not profiteered. The index of prices of other commodities shows an average increase of over 50 per cent from pre-war leve's, while gasoline and fuel oil are today at practically the same price as in 1913.

The oil industry has not been wasteful of its own products and every energy and every effort within the industry has been directed toward a steady reduction in losses of oil in all operations and a steady increase in the recovery of higher grade essential products and toward a more efficient utilization of these products.

The measured losses in the oil industry through all operations, from well to consumer, amount to less than 3½ per cent of the total volume of petroleum produced, a remarkable achievement in view of the character of product handled.

The oil industry has not been able to keep its production of raw material in exact pace with demand and periods of overproduction have resulted in financial loss to operating units and in partial demoralization of the industry.

The American oil industry has not developed along economical lines due largely to conditions of land ownership outside the control of the industry. It has not been able to overcome the evils of excessive competition, and unnecessary capital has been expended in duplication of operation not only in drilling of closely spaced wells but in parallel pipe lines, neighboring refineries and in an extravagant multiplication of service stations.

This is a burden that the industry has created largely by its own activity but the public has had the advantage of complete and convenient service and of low prices.

What the Oil Industry Is Doing

The American oil industry is now engaged in a co-operative effort to solve its own problems and to further improve all methods of operation.

The American Petroleum Institute affords a medium for free exchange of ideas and information between executives and departments of all oil companies.

Technical research problems are being studied under careful guidance and control.

Committees are at active work in an effort to find means for more intelligent and economical development of oil lands and in a study of possible legislation which would afford greater freedom in co-operative control of production and distribution.

The membership of the American Petroleum Institute and the body of the entire industry stand pledged to co-operate with the Federal Oil Conservation Board in furtherance of President Coolidge's policy.

The American oil industry developed under private control by American initiative, energy and capital has had such rapid growth that the use of the products of petroleum for power and for lubrication has made possible the use of machinery in industries and in agriculture, while the rapid and economical transportation of passengers and freight by oil driven engines on land, on water and in the air, is the outstanding economic achievement of this century.

This is an achievement for which the American oil industry is responsible and of which both the men engaged in the industry and the entire American public may be proud.

We have had three years of debate, three years of agitation, three years of generalization. They have been constructive years. Every oil organization in America has benefited from the work that has been done. As perplexing and as baffling as the problems have been, the industry is moving forward in its practices. We are further along not merely in discussion, but in the art of producing oil, than we were three years ago, or even one year ago. To those who take counsel of their fears that something revolutionary—that some vague "control" or regulation may be imposed upon us if we don't watch out—my counsel is that they forget their fears, and join us in an effort to do everything which it is humanly practicable to do. Nothing could be more fatal for us, under present circumstances, than to take a purely negative position. Our attitude must continue to be that which was so wisely expressed by Charles Evans Hughes when he appeared in our behalf before the Federal Oil Conservation Board:

"In a general sense, it may be said that the purpose of this inquiry is to direct attention to the need and methods of conserving our oil resources. No one will question the vast importance of these resources. No one, I am sure, would dispute the desirability of conserving them. . . . . As we ought to be, and I believe we are, united in the endeavor to determine deliberately and dispassionately what courses are practicable, we should not have our judgment either warped by alarms or benumbed by complacency. The question of possible courses of action, in dealing with the problems which confront the industry for whose products there is a constantly increasing demand for beneficial uses, is a severely practical one and should be dealt with as such from the start."

I have to recommend, therefore, that we take time to continue our studies as to the real function of gas and other forms of energy as they exist in the ground with oil and so use them that they will not only lift the fluid to the surface of the ground, but will do so economically.

In my opinion the oil business is entering a new era. Conditions, and practices under which we have been operating have gone never to return, a change similar in character to the passing of the old Bonanza days of mining for metals; new conditions in our industry call for the exercise of strictly economical operations in every department—where in the past we have thought in terms of dollars, the future will call for study in the expenditure of cents—and profits in the business will flow only to him who gets the proper viewpoint, employs and makes use of the best technical advice and who produces his goods at the least cost.

Late Fields

OKLAHOMA

The Greater Seminole area produced 406,902 bbls. for the 24 hours ending at 7 a. m. Tuesday of this week. The pools produced as follows:

	Barrels*
Little River	38,695
Bowlegs	120,577
Earlsboro	165,451
Seminole	57,754
Searight	24,425
Total	406,902

*From 1,032 wells.

The most important well in the state is the Snowden & McSweeney wildcat in Section 13-7-6, 3 miles south of the Little River Pool. This well has been running very high, and tapped the Wilcox formation at 4,315-16 feet, and began flowing 40 bbls. an hour.

It is reported that the well will be pinched in, in accordance with the regulations promulgated by the Seminole operators' committee and the umpire in charge of the field.

This well makes another spot for the group of potential producers which are completely under control. The Independent Oil & Gas Co.'s No. 1 Harris in Section 23-7-6 is shut in to a daily output of 100 bbls. The Gypsy Oil Co.'s well in Section 16-8-5, and the Mid-Continent Petroleum Corp.'s No. 1 in Section 5-7-7, east of Little River, are also shut in. Should all of these wells be opened widely, at least 150 drilling rigs would be started, and a new outlook for Seminole would be in view.

Another interesting wildcat in this area is the Barnsdall Oil Co.'s well in Section 14-8-5, which now has 2,000 feet of oil in the hole from the Simpson sand found at 4,251-59 feet.

WINKLER COUNTY

FORT WORTH, Tex., Dec. 6.—Amerada Petroleum Corp.'s No. 1 J. B. Walton, SW NW Secton 48, Block 26, Winkler County, is making about 1,000,000 feet of gas from 2,402 feet. The tools and 200 feet of drilling line were lost at that depth.

LET INDUSTRY DO IT

I recommend to your board, if you find that the facts justify, that you say to the American petroleum industry as a whole, first, that conservation and the prevention of waste of the petroleum resources of the country are of great national importance, and that every possible effort within our present economic requirements should be made to prevent waste and to protect, so far as possible, the probable needs of the Nation in the future; second, that you request the American Petroleum Institute and the petroleum industry as a whole to create an organization to conduct a nation-wide campaign to prevent waste by co-operative effort.—Thomas A. O'Donnell, former president American Petroleum Institute, before Federal Oil Conservation Board.

Technical Questions Answered

BY CHARLES K. FRANCIS, PH.D., TECHNICAL EDITOR

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible so as to assure a satisfactory answer.

All inquiries should be signed and if other than the given initials are to be used please indicate the desired letters.

Questions involving patented processes, intricate formulas and calculations and estimates of costs, for obvious reasons, cannot be answered. The replies will appear on this page within a reasonable time.

RELATIVE EFFICIENCY OF FULLER'S EARTH AND BENTONITE AS FILTERING MEDIUMS

What is the relative efficiency of fuller's earth and bentonite as filtering mediums? Do either or both of these materials require treatment before utilization?—F. V. E.

Bentonite is a mineral substance, large deposits of which exist in California, the individual particles of which are so small that they are microscopic in size. The particles are not crystalline and when mixed with water form permanent suspensions from which the mineral will not separate. By virtue of the large surface presented by these particles bentonite possesses great adsorptive power for various substances, including coloring matter. An extended description of bentonite was given on this page October 21, 1926. There are numerous clays of somewhat different composition which are used in a similar manner for filtering.

The special clays and fuller's earth may be used for the same purpose, that is for contact filtering. This consists in treating by agitation an acidulated oil with very finely divided clay, removing the sludge by settling and finally passing the oil through a filter press to remove the suspended clay. Fuller's earth is ground very fine for contacting, about 200 mesh, and is not treated before use. It is not considered to have as high efficiency as the special clays.

As state above, the special clays have a valuable property of adsorbing color, which is explained by their physical structure; they are classified as aluminum silicates. While their action is the same as fuller's earth they are more effective in the removal of color. They are usually especially prepared before use. The common method is to treat the natural earth with hydrochloric or sulphuric acid, remove the acid with repeated washings with water, dry the residue and finish by pulverizing. There are a few deposits that have been reported to contain material which has the power to remove color to such a remarkable degree that washing with acid is not necessary. The acid treatment of the raw material has the effect of increasing porosity, no doubt because of the removal of lime compounds, such as the carbonate, and other substances.

FUEL OIL COMPARED WITH COAL

Is there any standard figure which may be used for converting fuel values of fuel oil to equivalent units in coal with particular reference to locomotive use?—S. P.

When an effort is made to reduce fuel oil and coal to a common footing it becomes apparent that numerous possible variables must be considered. The composition of coal varies much more than does the composition of fuel oil, this is notably true about the worthless materials ash and water. There is also a wide difference in the heat units of coal while there is very little difference in the heat units available in the commercial fuel oils. Many other variables could be mentioned.

In a general way, and acceptable for all ordinary purposes, it may be stated that 3 bbls. of fuel oil will equal one ton of average coal. Many efforts have been made to have some standard coefficient established for the conversion of oil values into coal values but none has been selected by the recognized authorities. A study of the relative thermal values of coal and oil was made in 1924 by a committee representing the American Railway Association and the International Railway Fuel Association. Their report may be found in Railway Fuel by McAuliffe, page 239, from which the following is abstracted.

A statement covering 45 roads and 6,133 locomotives indicated the following ranges in equivalent gallonage:

Maximum gallons equal to 1 ton coal	122.00
Maximum gallons equal to 1 ton coal	193.00
Average gallons equal to 1 ton coal	159.13

The Bureau of Railway Economics submitted the equivalents reported by 72 roads which use fuel oil as follows:

Minimum gallons equal to 1 ton of coal	97.4
Minimum gallons equal to 1 ton of coal	354.0
Average of Eastern Dist., using 0.6 per cent of all oil	164.0
Average of Southern Dist., using 2 per cent of all oil	168.0
Average of Western Dist., using 97.4 per cent of all oil	159.0
Average of the 72 roads reporting	160.0

The Bureau of Mines submitted the following averages for fuel oils originating in Texas, California, Mid-Continent, and in Mexico:

Gravity	18.5
Pounds per gallon	7.851
B.t.u. per pound	19,007
B.t.u. per gallon	148,887
Pounds per 42-gal. barrel	329.74
B.t.u. per 42-gal. barrel	6,253,254

Among the recommendations submitted by the committee was "That 160 gallons of fuel oil, the mean of the several results obtained in the foregoing representation, be considered as the proper equivalent for 1 ton (2,000 pounds) of coal."

SOURCE AND USE OF MONTAN WAX

A sample of light yellow wax has been submitted to us with the statement that is known as montan wax. Where is this obtained and what is its use?—E. S.

Montan wax is a product which is derived from certain soft coal deposits in Germany, especially the lignites and brown coals. Certain petroleum products, the light fractions, and benzol are used to extract the wax from the raw material. The crude wax is dark brown, almost black, about the same specific gravity as water with a melting point ranging from 175 to 185 degrees Fahrenheit. The refined wax may be obtained after the crude wax has been refined, as a light cream or yellow colored wax. This has a melting point of approximately 160 degrees Fahrenheit.

The raw and refined wax may be used for treating paper for surfacing and waterproofing purposes. It is also suitable for the preparation of roofing paper, and as a substitute for creosote in wood preservatives. It has some value as a lubricant; also in combination with other materials for the manufacture of insulating compounds, polishing preparations, etc. Because of its high melting point it appears to have considerable value for blending with paraffin wax when making candles and other wax objects to be used in warm countries, because the normal melting point of paraffin wax is too low.

There are several firms in Germany now engaged in the manufacture of this wax, together with the special preparations in which it is compounded with other materials. It appears that the production of montan wax will increase with the development of the processes for making motor fuels from coal as it may be obtained as a by-product from some of the methods which have been described.

RECLAIMING LUBRICATING OIL FROM CRANKCASE

Are two distinct methods, centrifuging and distilling, used for reclaiming lubricating oil from the crankcase of automobile engines? Can such a plant be operated without paying a royalty? Is the distillation process patented? Are there many recovery plants in operation?—V. W.

There are a number of plants in several of the larger cities where oil which has been drained from the crankcases of automobiles is treated for further use. We have no record of the number of such plants. It is our understanding that some of the plants are operating with patented apparatus, but there can be no valid patents covering the principles applied to the ordinary operations involved.

There are four types of recovery processes which are treating, filtering, distilling and centrifuging. Some oils may be sufficiently cleared and purified by a combination of washing and treating; this may be done by washing with warm water, treating with acid, on the same principles as used in refineries for the purification of lubricating stocks, applying an alkaline wash and final washing with water. The filtering method seems to be very satisfactory for simple clarification, which includes removal of particles of metals, dirt and water. The centrifugal process is another method which improves the mechanical condition of this kind of oil, doing about the same work as when the oil is filtered. The distilling of crankcase oil is something different, because this operation completely alters the physical and chemical nature of the product.

When the oil is distilled there is a return to the original refining process in which a number of fractions may be obtained. If the oil to be reclaimed contains a large quantity of light products, which have resulted from crankcase dilution and the decomposition of the lubricating oil, distillation is the only means which will give a satisfactory separation. Usually the reclamation by distilling will give a separation into two products, the light or more volatile portion making up the distillate and the heavier lubricating oils constituting the residue. Should a high quality be desired it will be necessary to treat this residue.

Satisfactory recovery of lubricating oils may involve several operations and may include all that have been mentioned. Very much depends upon the character and condition of the oil. Some kind of filtering, for the removal of metals, etc., is essential and additional treatment will be governed by conditions. It must be noted that the ordinary process for the recovery of oils does not return the final product to the same condition as the original oil. There is no doubt something of value in much of the oil that is drained from the average crankcase and if properly processed this material will yield a product of value for many things.

A survey of conditions leads us to the opinion that there is little room for plants which propose to recover crankcase oil and place the product on the market as an automobile lubricating oil. The average car costs enough money to warrant proper lubrication and the lubricating oil now being sold on the American market is the result of science combined with skill and it is a product meeting the specifications of the automotive engineer, the refiner and the Government. Under the conditions of use some of the lubricating qualities are destroyed and these cannot be restored by any kind of treatment. The lubricating oils are cheap enough and it would be a mistake for anyone to submit his car to possible serious damage that may result from the use of an inferior lubricating oil.

COMPOSITION OF SEA WATER AND OIL FIELD WATERS

Is it a fact that oil well water is almost the same as sea water? In what respect does sea water differ from the water found in oil wells?—M. J.

The composition of sea water varies to some extent; however, there is not the wide difference that is found in oil field waters. The following may be considered fairly representative for the Atlantic Ocean adjacent to the United States:

Determined—	Parts per Million
Chlorin	19,350
Bromin	66
Sulphate	2,690
Carbonate	72
Sodium	10,171
Potassium	387
Calcium	419
Magnesium	1,304

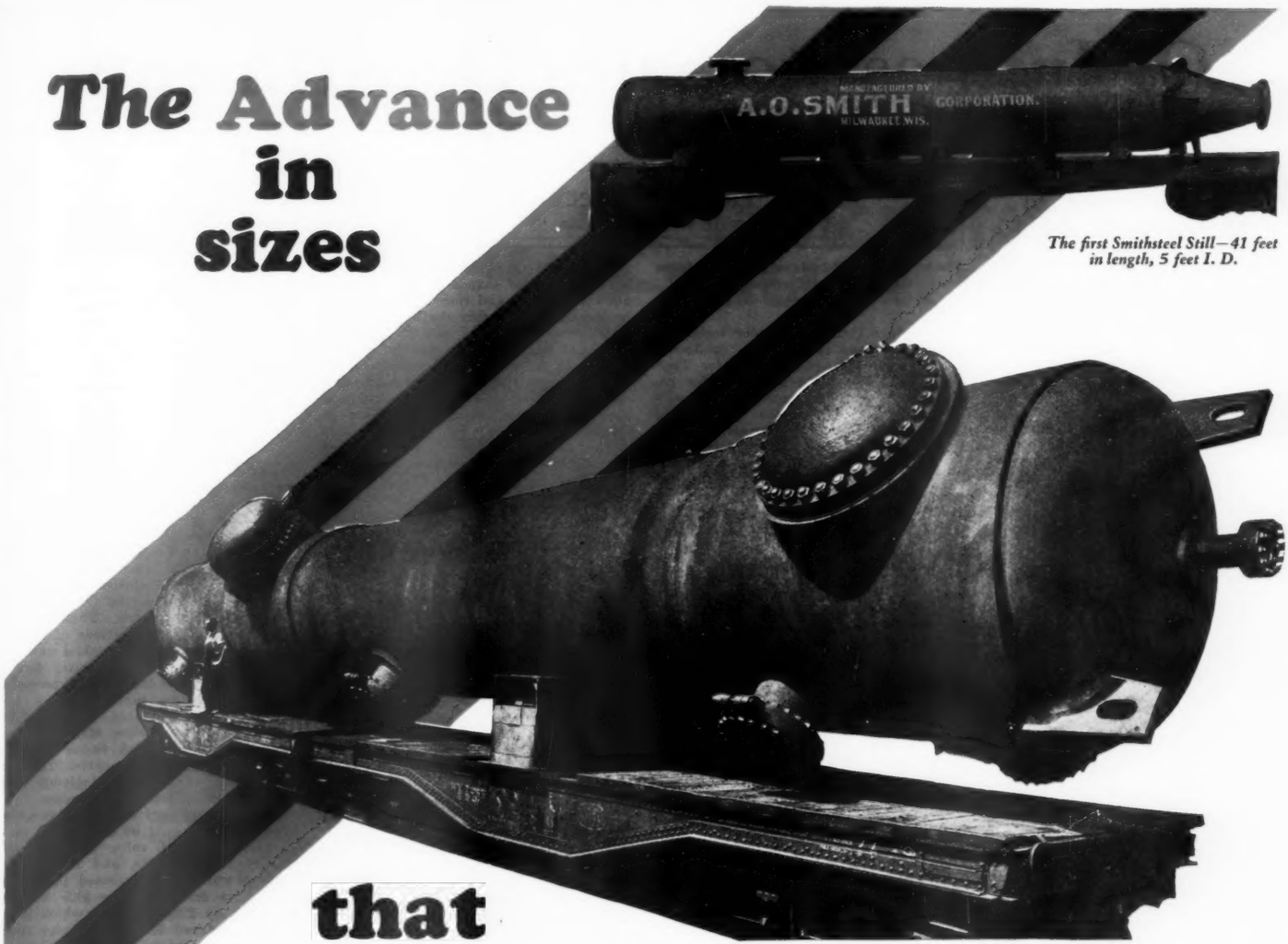
In addition to these there are traces of numerous substances, including iodin, fluorin, phosphorus, arsenic, lithium, barium, strontium, aluminum, manganese, iron, nickel, colbalt, gold, radium, copper, zinc and silver.

Oil field waters range from almost pure to saturated solutions, the exact nature of the substances carried in solution of course being largely dependent upon the character of the formations in which they are found. Example illustrating how the composition of oil field waters differs may be given from analyses reported by the Bureau of Mines in Technical Paper 404, by C. E. Reistle. These two samples were obtained from widely separated districts, Oklahoma and Wyoming.

	Waters from— Cleveland Field Okla.	Salt Creek Field Wyo.
	Parts per Million	
Aluminum	1.448	None
Calcium	12,573	Trace
Magnesium	721	None
Sodium	54,400	1,350
Chloride	113,617	602
Sulphate	224	224
Carbonate	....	....
Total solids	182,983	3,267

There have been instances of water found in oil formations which show a composition practically identical with that of sea water, and in some cases the evidence suggests that such water is actually fossil sea water. It is explained that the sea water may have entered the strata before they were folded and then earth movements sealed or trapped these bodies of water in structures upon which the water had little action.

The Advance in sizes



The first Smithsteel Still—41 feet in length, 5 feet I. D.

One of the latest—70 feet in length, 8 feet I. D.

that came with Smith

The first Smithsteel Cracking Stills were built in wall thickness of 2½ inches.

Since that time the Oil Refining Industry has steadily progressed to the point that a wall thickness of 3¾ inches is now frequently specified. Thicknesses up to 6 inches can be built in Smithsteel.

By themselves these figures mean nothing.

But when it is considered that each increase in wall thickness, made possible by Smithsteel, means corresponding increases in length and diameter—and therefore increased cracking capacity—these figures become significant to every refiner of crude oil.

A. O. SMITH CORPORATION
Oil & Gas Field Products Division
General Offices—Milwaukee, Wis.
District Offices at Pittsburgh, Tulsa, Dallas, Los Angeles

SMITHSTEEL CRACKING STILLS

Of Interest to Sales Departments

Use of Alcohol as Antifreeze and in Motor Fuel Growing

Approximately one-half of the total alcohol production in the United States is now devoted to some phase of automobile manufacture or operation according to the Commerce Monthly of the National Bank of Commerce. About 40,000,000 gallons are used yearly in antifreeze solutions for radiators.

Commenting on this outlet the publication states "the popularity of closed cars and their use generally throughout the winter months have brought a steadily growing market for denatured alcohol. The remarkable progress of truck and motor bus transportation has further stimulated the consumption of alcohol for this purpose. Although the length of the winter season and its intensity affect total consumption to some extent requirements have shown a striking expansion in the past five years."

"Recently glycerin and ethylene glycol have provided some competition in this field but neither has as yet seriously affected the place of industrial alcohol which is cheap and satisfactory as an antifreeze material. Glycerin, a by-product of soap manufacture, is reported to have been successfully made from alcohol waste. This development through cheaper production costs may increase its use as an antifreeze but the immediate threat to alcohol is considered remote."

Relative to the use of alcohol as a motor fuel the Commerce Monthly states: "In countries dependent on imported gasoline, alcohol as a motor fuel, either alone or mixed with gasoline, is looked upon as a partial solution of the problem of supplies. It suffers by comparison with gasoline, as it has a higher ignition point, it gives less mileage to the gallon than gasoline and its use requires some alteration in the type of engine used. The price differential in favor of gasoline and various local drawbacks have somewhat retarded development, but the use of alcohol in this capacity is growing. In France, Italy and a few other countries there are government regulations to encourage the mixture of gasoline with alcohol in order to reduce gasoline consumption. But the eventual success or failure of the synthetic petroleum now being developed in Germany and elsewhere will probably determine to a large extent what will be the motor fuel of the future. The mixture, gasoline and tetraethyl lead, which is an alcohol product, has been selling on the open market for the past few years and is regarded as particularly valuable because of its antiknock properties.

"Mixtures of gasoline and alcohol have been possible only because of the commercial development of absolute alcohol a few years ago. Ordinarily alcohol contains about 5 per cent water, whereas anhydrous or absolute is 100 per cent alcohol. It is only by virtue of this quality that it can be mixed with gasoline for a motor fuel since ordinary alcohol will not answer the purpose. Absolute alcohol is also more effective as a solvent, possessing chemical properties not shared by the other, and its successful manufacture at a cost that makes it commercially available has opened the way for far-reaching industrial developments."

A CUSHION SCHEME

ST. LOUIS, Mo., Dec. 3.—The Lubrite Refining Co. is giving away cushions for motorists. These are round cushions of good material and workmanship which will be given to patrons of the stations of the company on presentation of 5 coupons and the additional payment of 90 cents. Each purchaser of 5 gallons of gasoline receives a coupon.

Short Talks on Specifications

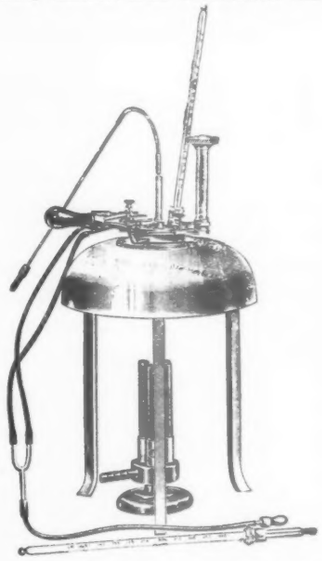
By W. T. Ziegenhain

Flash Point of Petroleum Oils by Means of the Pensky-Martens Closed Tester

There are three flash point testers in common use and approved by the American Society for Testing Materials for petroleum oils. These are the Tag closed tester for all oils other than fuel oil having a flash point below 175 degrees Fahrenheit the Cleveland open cup for all oils other than fuel oils having a flash point above 175 degrees Fahrenheit and the Martens-Pensky closed tester for all fuel oils. Exceptions are made in practice and when a sale involves the flash specification, the kind of tester to be used should be understood.

Since fuel oil is a residual oil from the refining operation and somewhat of a by-product rather than a refined oil it is likely to contain a wider range of different boiling point hydrocarbons. The fuel oil tank serves as the dumping grounds for most any kind of clean oil spoiled in processing and in too small volume to reprocess. With these possibilities of containing volatile fractions, the flash point specification is important from the standpoint of safety.

This is made all the more important since fuel oil is stored and used in so many different kinds of industries under



various conditions. A low flash point is sometimes necessary, however, especially when the fuel is used in automatically controlled furnaces, opening and closing the fuel supply. In that case the oil must have a low flash in order that it readily ignites when turned on. But these low flash fuels are usually the very light fuels and distillates and might be classed as furnace oils rather than fuel oils.

The Pensky-Martens tester is shown in the accompanying picture. It includes a brass cup of standard dimensions, a lid, burner and thermometer. The lid is equipped with a stirrer on a steel shaft mounted vertically in the center of the cup holding two two-bladed brass propellers. The lid is also equipped with a brass shutter so shaped and mounted to allow it to open and close three openings in the lid. When this shutter is rotated to its open position, it also introduces a small gas flame into the cup.

In making a test, the sample of oil is poured into the cup to the mark indicated. The lid is fastened in place and the thermometer inserted as shown in the picture.

The burner is lighted and adjusted to raise the oil temperature from 9 to 11 degrees per minute. The stirrer is also rotated from one to two revolutions per minute. The small test flame is applied each 2 degrees starting on an even number, about 30 degrees below the expected flash point of the oil. For temperature ranges above 220 degrees Fahrenheit, the test flame should only be applied every 5 degrees starting with a multiple of five. Stirring is discontinued during the application of the test flame. The flash point is the temperature shown on the thermometer when a distinct flash first occurs as the test flame is lowered into the cup.

CALIFORNIA REFINERY GASOLINE PRODUCTION

Refinery gasoline production in California continues to gain steadily, according to reports of the Bureau of Mines. The October production of 50 refineries totaled 5,355,847 bbls., the largest monthly output in the history of California Field. This October output represented a 4 per cent increase over the September output and 22.46 per cent over October, 1926.

Cracked gasoline is still a minor factor in the total output of California gasoline, the production for October being only 366,063 bbls. The increase in the output of cracked gasoline this year on the west coast has not been as great as was predicted early in the year due to the exceptionally low prices which have prevailed for gasoline. One of the larger refiners recently completed the installation of two large cracking units. These units will not be operated until market conditions are more favorable.

Following is the daily average production of refinery production this year: January, 159,355 bbls; February, 161,670 bbls.; March, 152,495 bbls.; April, 164,473 bbls.; May, 156,911 bbls.; June, 157,726 bbls.; July, 160,432 bbls.; August, 159,702 bbls.; September, 171,655 bbls., and October, 172,769 bbls.

GARDNER PETROLEUM CO. MOVES

The Gardner Petroleum Co. has moved its offices from the Exchange National Bank Building to the Tulsa Trust Co. building on Boulder, near Fourth Street, Tulsa.

ESTABLISH NEW RECORD

The natural gasoline division of the Empire Oil & Refining Co. during the month of November established a new production record. The average daily output of the company's natural gasoline plants was 128,711 gallons with a peak production of 133,173 gallons. This record daily production was obtained from 135,089,000 cubic feet of natural gas. To take care of this large output the company for the week ending November 23 shipped out 154 cars of gasoline.

The natural gasoline division of the Empire company is one of the largest manufacturers in the Great Seminole area. The company recently has greatly increased its output in the Little River Pool of the Seminole area.

USE OIL FILLED CABLE IN UNDERGROUND LINE

An oil-filled underground cable capable of handling double the voltages now handled by ordinary cables provides a new use for petroleum oils of high dielectric strength. The design of the new underground oil filled cable was described by Philip Torchio, vice president in charge of electrical engineering for the New York Edison Co., in a paper read before the Great Lakes subdivision of the American Institute of Electrical Engineers in Chicago, on November 29. In describing the cable, Mr. Torchio said:

"The cable, which has aroused keen interest among engineers and cable manufacturers throughout the world, was first installed in the United States during the past summer—12 miles being owned by the New York Edison-United Co.'s system and 6 miles by the Commonwealth Edison Co. of Chicago. These are the only commercial installations of this cable in the world. In the cables now generally in use the copper wires form a solid core, surrounded by oil-impregnated paper, which is enclosed in a lead sheath. The new cable, instead of being solid, has its wires stranded about a copper spiral, which forms a hollow the entire length of the cable. This central hollow or core is completely filled with oil under constant pressure.

"It was only very recently that underground cables could be designed to carry as much as 66,000 volts. The new cable carries 132,000 volts, and in the engineering world it is expected that cables of similar design will be able to carry as much as 220,000 volts, which is the voltage required for long-distance transmission and system interconnection.

"The theory of the oil-filled cable," Mr. Torchio said, "is that through its collapsible oil reservoirs it responds readily to volumetric changes in oil and cable due to temperature changes. In this manner, the whole cable is kept constantly filled with oil under pressure, both in the hollow core of the conductor and throughout the surrounding insulation. The unique advantage, therefore, of this type of construction, is that, should the lead sheath be expanded or distorted, or the internal elements of the cable be displaced by temperature variation, or other causes, the spaces thus formed will be immediately filled with oil, while in a solid insulation type, voids would be formed, causing ionization and ultimate failure."

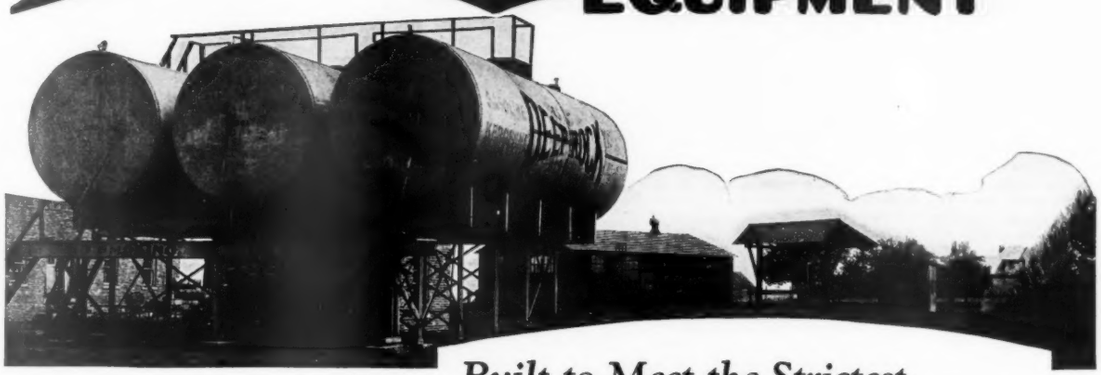
COAL PRICES LOWER

Those who are especially concerned in the fuel oil market have been interested in the coal price trends since work was resumed at many of the union mines under a new wage agreement. The resumption of employment in mines which were shut down in April when the union strike became effective has naturally increased the coal output.

Bituminous prices have slumped, especially in the Middle West and areas adjoining. The industrial demand for coal has not been as great as expected, although buying was steady previous to the strike settlement. Now that an adequate supply is assured these consumers have slowed up in their purchases.

The advent of cold weather will be reflected in an improved demand from practically all classes of consumers according to coal authorities. However, unless this demand is much larger than anticipated, it is not expected prices will materially improve as the supply with the union mines in operation should be adequate.

Leader BULK PLANT AND SERVICE STATION EQUIPMENT



Built to Meet the Strictest Demands of Practical Oilmen

LEADER Bulk Plants are complete in every detail, including the LEADER RIVET-WELD tanks. You furnish the ground and specify the size and type of plant required; we do the rest, from pouring the concrete until the plant is in actual operation.

LEADER Truck Tanks, built to fit any chassis, are constructed throughout of ARMCO Rustless iron—wood has been replaced by steel wherever possible, bearing in mind, however, to keep construction as light as would be consistent with strength.

LEADER Filling Station Underground Tanks are built in strict accordance with Underwriters' specifications. Uniform, black, open hearth steel is used in construction—heads are cold, flat, flanged, with all seams electrically welded.

LEADER Air Compressors are complete, ready to install. The tanks are of LEADER RIVET-WELD construction. The air cooling system has no valves or other intricate complications. They are the vertical type with suspended crank shaft bearings, laminated shims, balanced, lightweight pistons and innumerable other mechanical features essential to dependability, durability and economy.

LEADER Grease Rack features are obvious. They are portable, safe and economical. No special foundation is required and installation is easily made in one hour, (2 men). The runways are pressed into form by hydraulic pressure, there are no sharp edges and it is practically impossible for a car to run off the rack by climbing the sides. These racks are made in two sizes with 8″ and 10″ rack specifications. Low in cost and with no maintenance expense.

LEADER IRON WORKS

Originators of Rivet-Weld *construction*

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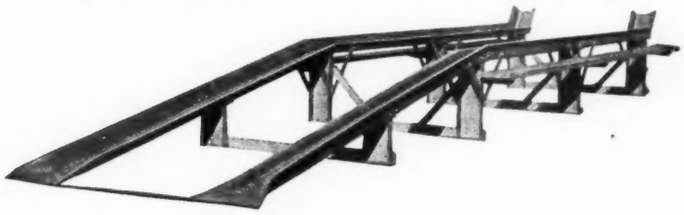


Adapt New Towers to Shell Stills

Kanotex Installation Continues Use of 11 Units of Varying Sizes in Rebuilding Crude Oil Battery

By C. O. Willson

The Kanotex Refining Co. during the past month has started operating a rebuilt crude oil battery. The battery is an excellent example of the progress made in designing fractionating equipment to secure the maximum operating returns from shell stills which already had several years of service.

The only major change made in the crude oil battery was confined to the installation of bubble towers replacing baffle towers. Based on the operation to date the changes made have added to the capacity of the distillation equipment and eliminated all rerunning with larger yields of light end products. Greater flexibility in operation and lower fuel costs are additional advantages.

The crude oil distillation equipment at the refinery consists of 11 shell stills. The battery as now operated is composed of two 600-bbl. stills, one 350-bbl. still, three 300-bbl. stills and five 200-bbl. stills. The first of these stills was installed at the time the refinery was built when batch distillation was still common among refiners. The smallest stills were formerly used in a rerun operation.

When the decision was made to improve the refinery's fractionating equipment it was also decided to utilize these shell stills as the distillation equipment for the new operation. The furnace design of these shell still units had already been changed so as to give efficient operation.

The problem of the Kanotex management was to adapt the bubble tower installations to these shell stills all of which are now included in the one crude oil battery. It is believed that the new fractionating equipment gives the maximum operating efficiency that it is possible to obtain from the shell stills.

This plan of adapting the fractionating equipment to the distillation unit is in contrast to the policy which has been adopted by some operators. The latter have been inclined to install towers which meet certain aribitrary specifications as to design and then endeavor to adapt the operation of their shell stills to this fractionating equipment. In many cases this has meant an unnecessary sacrifice in the distillation efficiency of a battery. In other words, as one operator pointed out to a group of technical men recently it is "just as necessary in efficient operation to secure the maximum performance in the distillation end as it is in the fractionating end." This overall efficiency obviously cannot be accomplished by sacrificing one for the other.

The accompanying flow chart shows the arrangements of towers and stills. The crude oil charge coming from the fuel oil and gas oil heat exchangers passes to the first 600-bbl. shell still and then to the second still of the same capacity.

From the second still the crude oil minus the light fractions is steam jetted to the stripping section of the third tower. This steam jet takes the place of a hot oil pump. It will be noted that the same method of transfer for the hot oil is followed out in the fourth and fifth towers. The use of the steam jet is now general among the newer crude oil installations where it is necessary to transfer hot oil from one distillation unit to another.

Several advantages are claimed for the steam jet in crude oil batteries of this type. In the first place there is considerable saving in investment. Ordinarily less steam is required for the oil transfer with the jetting operation than with the hot oil pumps. From the standpoint of control operators have not had any trouble with the steam jet when properly installed. Finally it is claimed by some engineers that the contact of the steam and hot oil tends to break up the latter and aids the distillation operation the same as when live steam is introduced into a shell still.

The reflux from the third bubble tower drops back to the third and fourth still. From the latter still as shown in the flow chart the hot oil goes to the stripping section of the fourth tower. The reflux from this tower drops back to the fifth and sixth stills. From the latter still the liquid is forced by the steam jet to the stripping section of the fifth tower. The reflux from this tower goes to the seventh and eighth stills.

The crude oil stripped of all of its light ends passes directly from the eighth to the ninth still. This still is fired so as to take all the stove distillate overhead with a gas oil reflux from the bottom of the tower. Gas oil cuts are taken direct from the tenth and eleventh stills.

The yields shown in the chart are approximate and are based on a daily charge of 10,000 bbls. of 36 degree gravity crude oils. From the first three towers 3,300 bbls. of 375 endpoint gasoline is obtained. A yield of 700 bbls. of 400 endpoint gasoline is secured from the fourth tower and 700 bbls. of kerosene from the fifth tower. The distillate yield with this method of operation would be 500 bbls. with a gas oil recovery of 2,500 bbls. The residuum which constitutes about 30 per cent of the crude charge is an 18-22 gravity fuel oil.

The yields obtained will vary with the products obtained and these in turn are dependent on the demands of the marketing department. The bubble towers were designed to give the required flexibility as to products. The battery can be operated so that all the gasoline steams can be blended into one grade of gasoline meeting domestic or export requirements.

In the design of the towers it will be noted that the largest towers are Nos. 3, 4 and 5. This variation is size of towers goes back to the plan previously mentioned of designing the equipment in line with the work to be done. A line of towers, all of uniform size may have some value from the artistic standpoint but they are no longer considered an indication of good engineering practice.

Operators have come to realize that in bubble tower installation on crude oil batteries the light gasoline ends can be taken over overhead with relatively small towers. The real work from the fractionating ends comes in the handling of the heavier gasoline and kerosene fractions. This is especially true when the tower contains a stripping section as well as a rectifying column.

In the Kanotex installation the third, fourth and fifth towers are much larger than the first two towers. The fourth tower which is responsible for the close separation between the kerosene and last gasoline stream, the tower is approximately 65 feet high.

The towers from which the light oil streams are taken all have "knockout" coils as shown in the flow chart. These coils determine the endpoint of the overhead streams. By means of automatic valve control based on the temperatures at the top of the towers, uniformity is assured in the specifications of all the light oil streams.

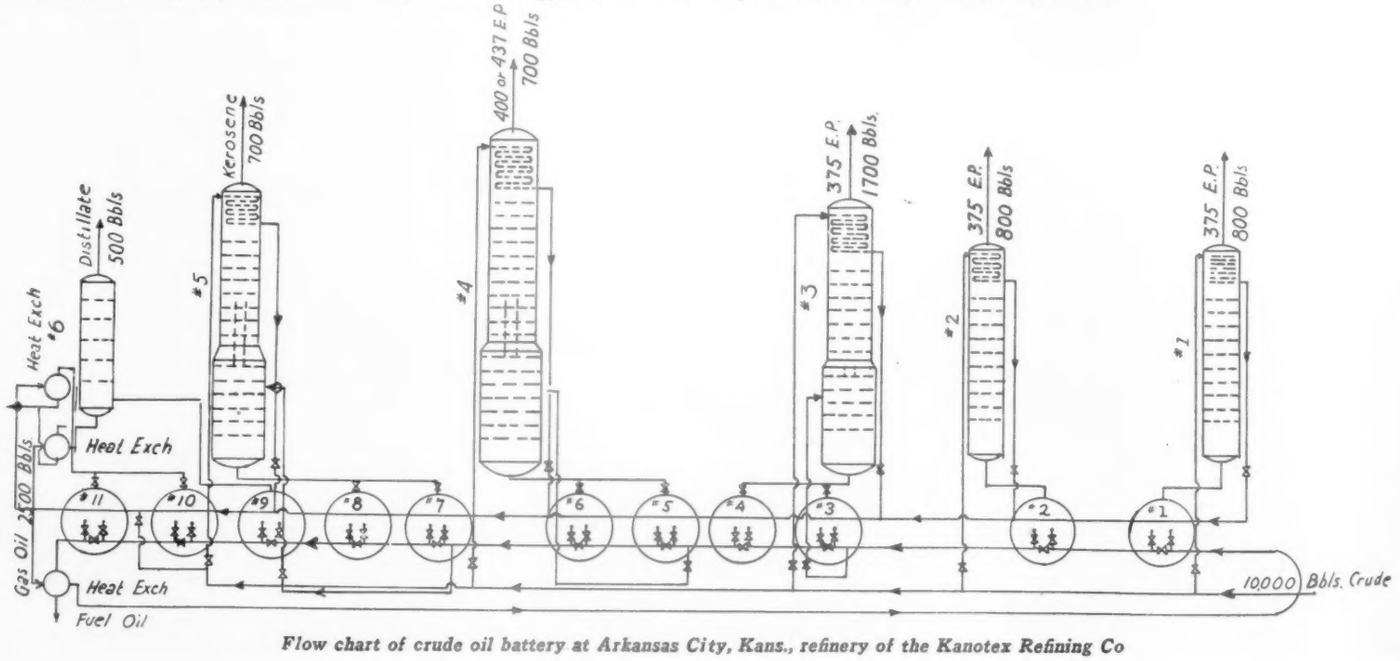
Relative to the present capacity of the battery it is interesting to compare the present 10,000-bbl. throughput with the capacity of the same stills under the old method of operation. The 11 stills considered separately have a total capacity of 3,250 bbls. Operated the old batch method and taking 65 to 75 per cent overhead these 11 stills probably could not have refined more than 2,000 bbls. daily. With the type of towers then in general use it would have been necessary to rerun all the light oil streams.

With the continuous type of installation which followed the batch distillation the capacity of the 11 stills with a baffle type of tower could probably have been increased to as high as 6,000 or 7,000 bbls. daily. It would still have been necessary to rerun some of the overhead streams from the topping operation. The addition of the bubble towers including the stripping section which greatly lessens the work of the stills plus the heat exchange system is responsible for the increased capacity to 10,000 bbls. daily with all rerunning eliminated.

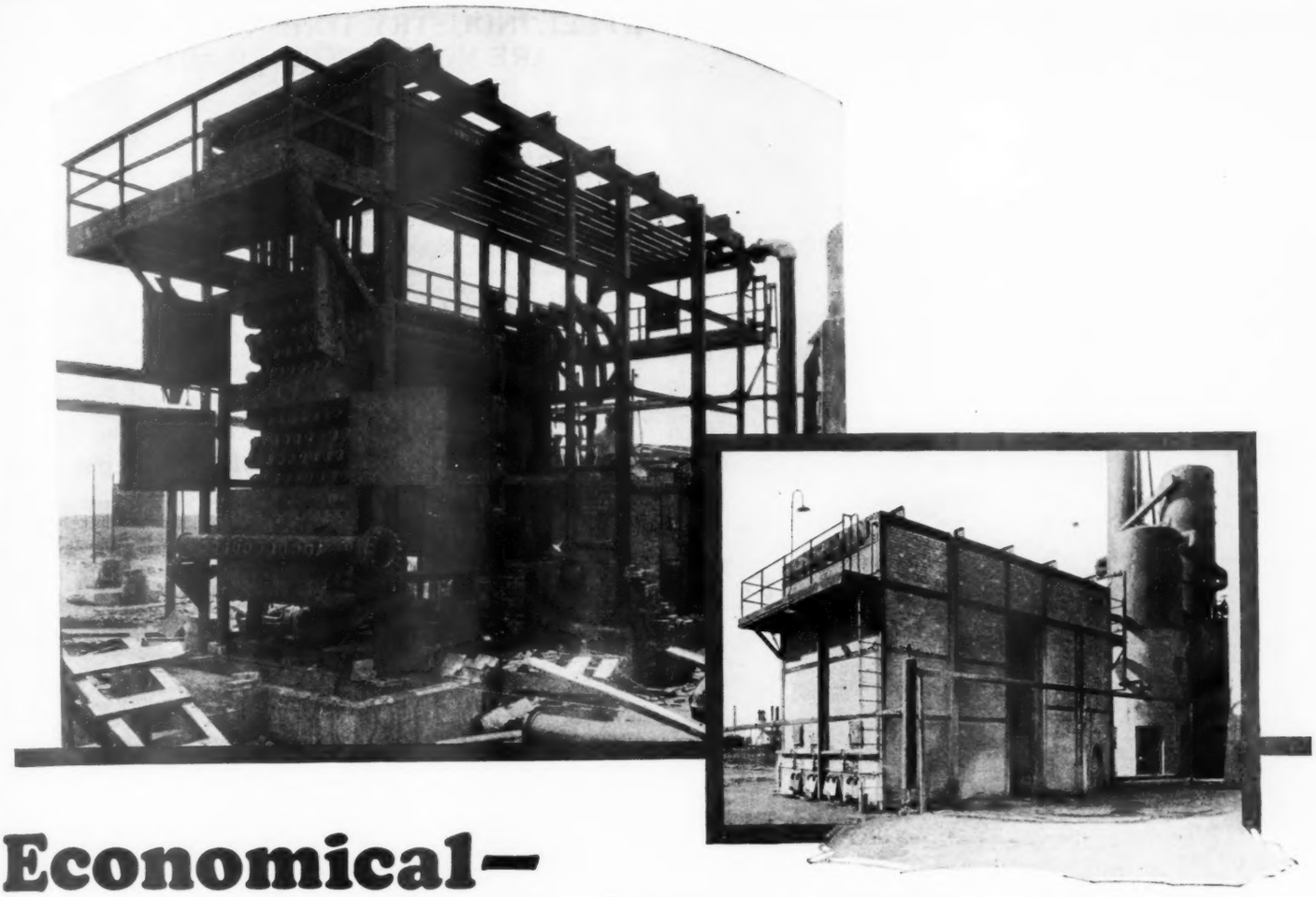
Exact data as to fuel costs are not available at this time. The results to date however show a substantial reduction per barrel of throughput. On a settled operation it is not expected that any additional labor will be required.

When the battery was redesigned care was taken to take care of any emergency condition which might arise in the operation. Connecting lines are so arranged that one or more stills or towers can be cut out of the battery for repairs or cleaning without affecting the continuous operation. The connecting lines for the stills are 6-inch.

The towers were designed by the Winkler & Koch Engineering Co., Wichita, Kans.



Flow chart of crude oil battery at Arkansas City, Kans., refinery of the Kanotex Refining Co



Economical—in fuel—space—cost

IN a typical Foster Tube Still installation which replaced a shell still, it was found that the fuel consumption was reduced approximately 50%, and at the same time a greater yield of overhead was obtained. Furthermore, the positive oil circulation eliminated the necessity of using steam to prevent burning of the oil.

Besides these advantages, Foster Tube Stills are compact, economical in operating expense, permit long periods of continuous operation, and can be used for a wide range of refining distillation processes.

Foster Wheeler Corporation
A consolidation of Power Specialty Co. and Wheeler Condenser and Eng. Co.
165 Broadway, New York
Branches in principal cities.

FOSTER WHEELER

FRACTIONATING TOWERS HEAT EXCHANGERS
STEAM JET AIR PUMPS SUPERHEATERS
TUBE STILLS VACUUM PUMPS
WATER COOLED FURNACE SURFACES
BRASS AND COPPER TUBING AND PIPE

AERO UNIT COAL PULVERIZERS
AIR HEATERS CENTRIFUGAL PUMPS
CONDENSERS COOLING TOWERS
ECONOMIZERS EVAPORATORS
EXPANSION JOINTS FEED WATER HEATERS

The "American" Oil Well Pumping Jack!

The "American" Totally Enclosed Oil Well Pumping Jack has been designed in answer to the demand for the efficient pumping of individual wells.

American Jacks are made in four sizes—twelve inch to fifteen inch stroke, fifteen inch to eighteen inch stroke, eighteen inch to twenty-two inch stroke, and thirty inch to thirty-six inch stroke. All gears are totally enclosed and run in a bath of oil which floods the bearings, insuring smooth operation and long life. The head proper may be disengaged from the cable and swung back from the walking beam, permitting the rods to be pulled without moving the jack itself. There are no screw mechanisms or adjustments necessary. No gears are exposed.

Compact, sturdy and economical in operation! Ask for bulletin 181.

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STEEL INDUSTRY TONNAGE PROSPECTS ARE NOW REPORTED AS VERY GOOD

By B. E. V. Luty

PITTSBURGH, Pa., Dec. 5.—The principal item of interest in the steel market is the course of prices. The volume of demand might be said to be taking care of itself. It is not yielding materially in these closing weeks of the year when, if at any time, it could be expected to decrease, and it has plain and substantial prospects of increasing, both seasonally and from some special influences. The uniform record for years has been for steel production to increase month by month during the first three months of a new year, March being commonly the high month according to recent precedents. As to special influences, the automobile industry is now right on the verge of expansion, from the double influence of the new Ford model being out, and from the seasonal factor that December is regularly the low month in automobile production, with increases beginning in January. Another special influence is in railroad rolling stock. Month by month the railroads retire old cars and locomotives, but for many months they have refrained from purchases, requirements thus banking up, with every prospect that substantial orders will be released in a few months, if not in a few weeks.

At this time, therefore, the tonnage prospects of the steel industry are very good. A uniform rate of mill operation has been maintained since July 1, with practically no variation. The rate is relatively low, 15 to 16 per cent under the average during the whole of last year and 16 to 17 per cent under the average during the first half of this year but it has held steady in face of adverse circumstances. While requirements in some lines have decreased, requirements in other lines have increased. For instance, rail production has increased while pipe mill operations have decreased, comparing November with July or August.

Prices in Flux

As to steel prices, things are in a state of flux. In the past few weeks a much stronger feeling of co-operation has been exhibited by the large steel producers, shown by the recent advance in bars, shapes and plates, the great bulk of the tonnage being made by a few large interests. On the other hand, strips and sheets, which are made by a much larger number of producers, including many relatively small concerns, have weakened further, and perhaps wire products are a trifle weaker. Recently it was a common remark in the steel trade that when producers of these lines saw how bars, shapes and plates could be advanced they would turn in and do likewise with their markets. Nothing of the sort, however, has been observed. In the sheet market, indeed, the conduct of sellers can hardly be explained on any other ground than that they feel a process of elimination is at work, and each mill wants to avoid being in the class of the eliminated. In a sense this would be called destructive competition. The common remark in the trade is that, to illustrate, mills want to run at 70 per cent when there is only a 65 per cent demand, but the attitude of the individual producer may be that he does not want to risk aiming at only 65 per cent in fear that he may do only 60 per cent, but somebody else 70 per cent, whereupon he would have taken the first step towards annihilation.

Pipe Prices Steady

Even as to the bar, shape and plate advance, moreover, there is some question. The regular buyers were given coverage to the end of the year, if not into January, at old prices, before the minimum was set at $1.80, Pittsburgh at $1.90 Chicago, and so the new lacks serious test. Some mills are trying to secure $1.85 or $1.90 on lots of less than 100 tons, to pave the way for first quarter contracts with the larger trade at $1.80, but without a great deal of success thus far.

As to pipe prices, they are regarded as perfectly steady, the increased trimmings adopted some time ago being well held. It is said the experience of cutting leading to the whole market slipping was salutary and will prevent a repetition of special concessions being made.

The Atlantic Oil Producing Co., a subsidiary of the Atlantic Refining Co., has ordered 75 miles of 10-inch line pipe. Demand for oil country goods generally is light and standard pipe is tapering off seasonally.

Valley foundry iron is off 25 cents, at $17.25 furnace, the Standard Sanitary Manufacturing Co. having bought at this figure for first half.

Mr. Heywood Presents Record of Well Good 6,166 Bbls. per Hour

W. Scott Heywood, president of the Jennings-Heywood Oil Syndicate, Jennings, La., commenting on the Mid-Kansas Oil & Gas Co. and Transcontinental Oil Co.'s No. 2-C Yates in Pecos County, Texas, and big wells generally, claims Heywood Brothers' No. 2 Spindletop showed the largest per hour production of any well ever gauged in the United States.

The Mid-Kansas-Transcontinental gusher produced 2,059 bbls. in 45 minutes and was then shut in. This test was at the rate of more than 65,000 bbls. a day.

Mr. Heywood writes that six months after Heywood Brothers' No. 2 Spindletop came in in 1901 it was given a gauged test.

"We emptied one 37,500-bbl. steel tank and two 1,200-bbl. wooden tanks for the purpose of making this test, and Heywood No. 2 filled this 37,500-bbl. tank and the two 1,200-bbl. settling tanks at the rate of 148,000 bbls. per day," he writes, and continues that the facts are borne out by the affidavits of onlookers. A number of prominent oil men were present when the text was made, Mr. Heywood says, including J. S. Cullinan, former Governor Hogg, H. A. Mallett, Jim and Walter Sharp, Howard Hughes and others.

The Heywood test was a longer one than the Mid-Kansas-Transcontinental gave their biggest well. It must have averaged 6,166 bbls. an hour for nearly six and one-half hours, and for 45 minutes it must have averaged 4,624.5 bbls., while in the same length of time Mid-Kansas-Transcontinental's well was producing 2,059 bbls.

Therefore Mr. Meywood feels justified in saying that Heywood Brothers' No. 2 Spindletop was the biggest well in the United States.

KIOWA LEASE SALE

A public sale of oil and gas leases in the Kiowa Indian Reservation will be held in Anadarko, Okla., on December 15. Sixty-four tracts will be offered, scattered through Townships 7n-13w, 6n-13w, 7n-14w, Tracts 1 to 34 and 9n-10w, 11n-10w, 10n-11w, 7n-11w, 7n-12w, 7n-13w, 4s-14w, 6n-15w, 6n-16w, Tracts 35 to 64.

In the drilling contract attached to Tracts Nos. 1 to 34, inclusive, the following appears:

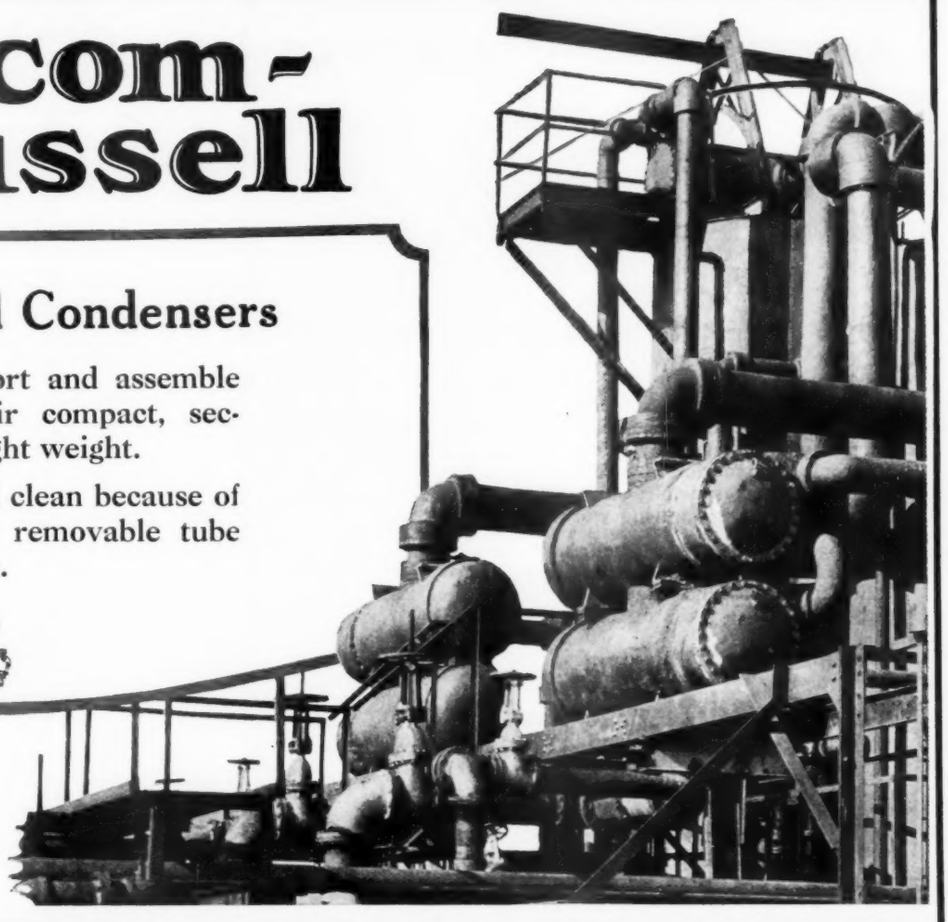
"On or before the expiration of sixty (60) days after approval of leases by the Secretary of the Interior actual drilling of a test well must have been started by, or through, the activities of the lessee, somewhere not over four (4) miles from any one of the above listed tracts. After drilling has been started it must continue without unnecessary delay to a depth of 2,500 feet unless oil or gas in paying quantities is found at a shallower depth. Provided, that if granite, Viola lime, Arbuckle lime, or boulders have been reached at less than 2,500 feet, the drilling contract will be deemed to have been satisfactorily completed according to contract."

Griscom-Russell

G-R Sectional Condensers

EASY to transport and assemble because of their compact, sectional design and light weight.

Easy to inspect and clean because of straight tubes and removable tube bundle construction.



The Griscom-Russell Co.

285 Madison Ave., New York

Philadelphia	Chicago	St. Louis	San Francisco
Boston	Detroit	New Orleans	Los Angeles
Rochester	Cleveland	Dallas	Seattle
Pittsburgh	Milwaukee	Houston	Tulsa
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For Canada:
Riley Engineering and Supply Co., Ltd., Toronto

Keep Your Rods Safe and Out of the Way In the LORRAINE SUCKER ROD RACK

Saves Time, Money and Sucker Rods

One of the most efficient devices for the conservation of rods, time and money. The Lorraine Sucker Rod Rack not only saves time in pulling rods and in getting the well back on production, but it preserves the rods from danger and damage while out of the well.

The value of broken, and damaged rods CAN run into considerable money, and the Lorraine Rod Rack forever banishes this hazard.

Simplicity, speed, safety and economy are obvious advantages. Why be without the hanger?

This device, as well as other Lorraine specialties for efficiency, speed and economy, are completely described in the Lorraine catalog which will be mailed on request.

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Percy D. Hammer, Agent
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Kern County Representatives:
New Method Pipe Slotting Company
Phone 465 Taft

Better generator design

Type "M-2-S" Rig Lighting Unit

THE generator end of the Pyle-National Type "M-2-S" unit is a four-pole machine, with a wave wound armature, giving the unit its remarkable voltage regulation and reliability features. An unusually large commutator and generous construction throughout the entire electrical end make this unit especially adapted to severe service conditions found in rig lighting work.

Four brushes are used, although two would be sufficient in an ordinary design. Four brushes insure perfect commutation at all times and any one of the brushes can be lifted without disturbing the operation of the unit.

Send for bulletins describing Type "M-2-S" in detail.

The Pyle-National Company

1334-1358 N. Kostner Avenue, Chicago, Ill., U. S. A.

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Canadian Agents:
The Holden Company, Ltd., Montreal, Winnipeg, Vancouver, Toronto

Export Department:
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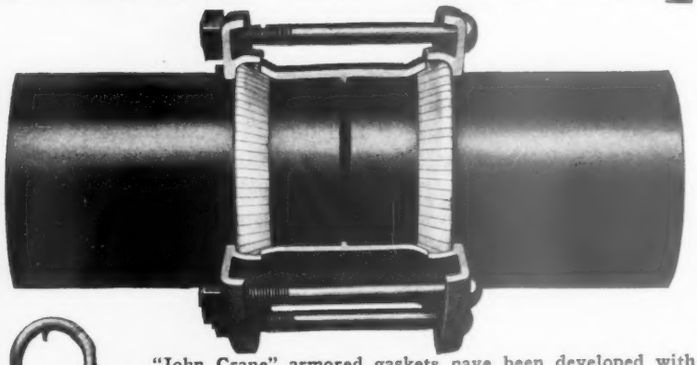
O&GJ 12-8 Gray

"John Crane" Armored Gaskets for Dresser and Dayton Joints



"John Crane" armored gaskets have been developed with the idea of overcoming the shortcomings of asbestos gaskets. They permit easy expansion and contraction. They are flexible, compressible and quickly installed. Armor of copper, aluminum foil prevents asbestos core from disintegrating.

They do not stick or vulcanize to the pipe. They resist acid, seal perfectly and can be used over and over, effecting a genuine worth-while economy. Suitable for high temperature exhaust joint service.

18 months service on exhaust joints have been recorded. Inquiry invited.

CRANE PACKING COMPANY
1819 Cuyler Ave., Chicago
CRANE PACKING CO., Ltd., Slough, Bucks, England

109 Broad Street NEW YORK | 616 Mission Street SAN FRANCISCO | 2005 Cedar Springs Road, DALLAS | Whealton & Townsend, TULSA

WEST TEXAS BEGAN ITS CLIMB WHEN OKLAHOMA STARTED SLUMP

The production of the combined fields of Kansas, Oklahoma, Texas, Louisiana and Arkansas, including the Gulf coastal fields, declined in October as compared with September, the falling off averaging 13,596 bbls. per day. The drop in production took place both in the Mid-Continent and the Gulf coastal-Southwest Texas divisions, having been most pronounced in Oklahoma, which declined from 803,722 bbls. a day in September to 781,413 bbls. in October. West Texas increased from 180,181 bbls. a day in September to 207,804 bbls. in October, but Texas altogether increased from 610,760 bbls. in September to 619,456 bbls. a day in October. Following are the figures, which give the production by pool in all of the states named:

Crude Oil Production in Bbls., in October 1927

Mid-Continent Fields

	Daily Av.	Month
Kansas	113,199	3,509,169
Oklahoma	781,413	24,223,803
North Texas	87,380	2,708,780
Central Texas	49,958	1,548,698
West Texas	207,804	6,441,924
Panhandle Texas	88,249	2,735,719
East Cent. Texas	29,995	929,845
Arkansas	100,555	3,117,300
North Louisiana	51,355	1,591,655
Total October	1,509,908	46,806,893
Total September	1,520,600	45,618,000
Difference	10,692	1,188,893
Gulf Coast and Southwest Texas		
Gulf Coast	141,272	4,379,432
Southwest Texas	29,782	923,242
Total October	171,054	5,302,674
Total September	173,958	5,218,740
Difference	2,904	83,934
Production by States		
Kansas	113,199	3,509,169
Oklahoma	781,413	24,223,803
Texas	619,456	19,203,136
Arkansas	100,555	3,117,300
Louisiana	66,339	2,056,159
Total October	1,680,962	52,109,567
Total September	1,694,558	50,836,740
Difference	13,596	1,262,827

KANSAS

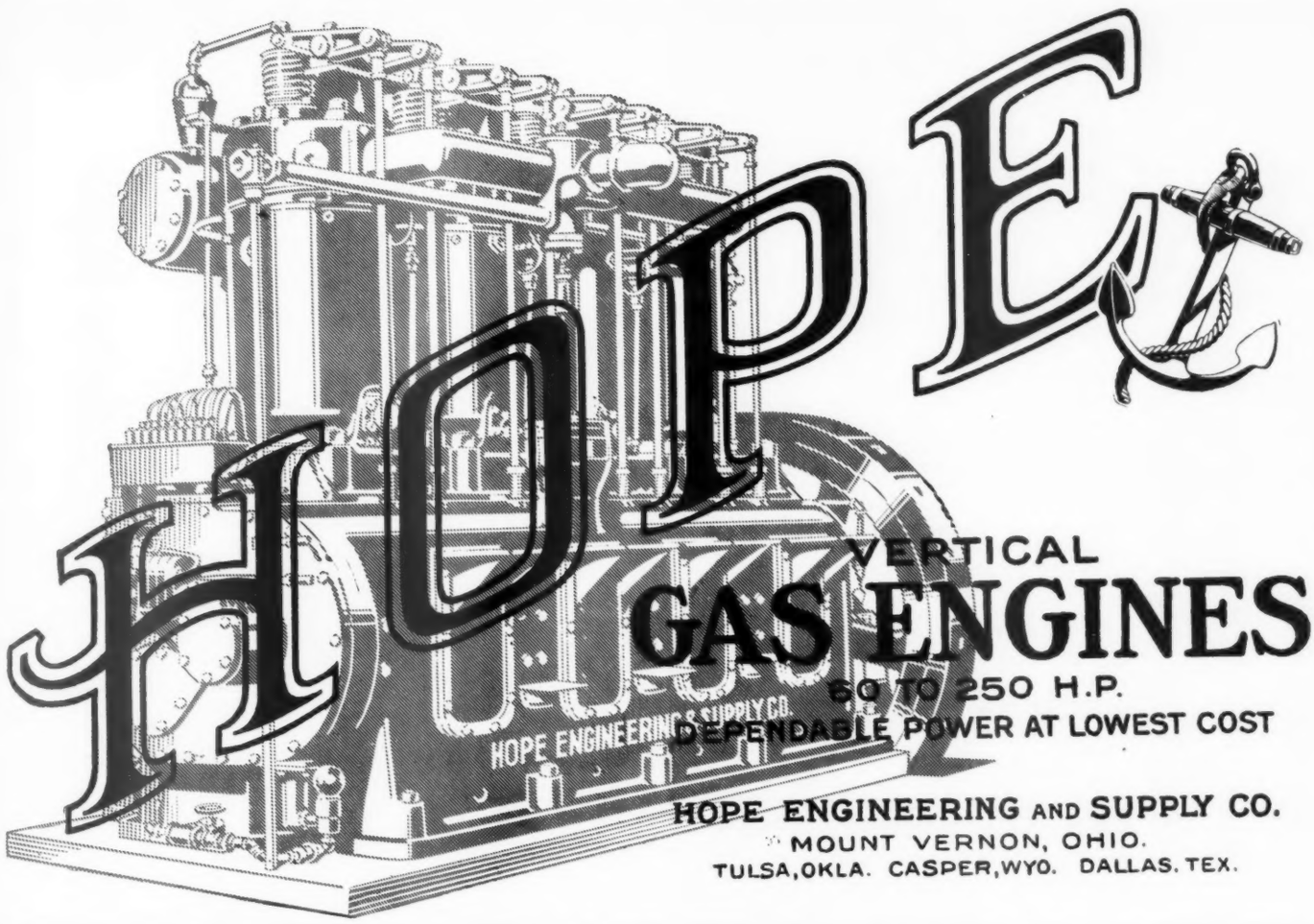
Daily Average and Total Monthly Production in October, 1927

	Daily Av.	Month
Marion County—		
Florence	694	21,514
Peabody	1,348	41,788
Covert-Sellers	733	22,723
Lost Springs	199	6,169
Total	2,974	92,194
Butler County—		
Elbing	2,410	74,710
Potwin	395	12,245
Cameron-Robinson	609	18,879
Wilson-Dunkle	1,483	45,973
Towanda	2,516	77,996
Fox-Bush	1,237	38,347
Nuttle-Koogler	1,872	58,032
Eldorado	7,677	237,987
Smock	211	6,541
Leon-Weaver	3,475	107,725
North Augusta	1,075	33,325
South Augusta	1,585	49,135
Sluss	340	10,540
Benton	50	1,550
Douglas	127	3,937
Keighly	1,851	57,381
Eastern Butler	1,059	32,829
Total	27,972	867,132
Greenwood-Woodson Counties—		
Sallyards	1,280	39,680
Teeter-Pixley-Scott	9,264	287,184
Virgil	5,647	175,057
Thrall-Burkett	2,366	73,346
Seely	9,383	290,873
Polhamus	1,283	39,773
Miscellaneous	2,167	67,177
Total	31,390	973,090
Cowley County—		
Rainbow Bend	1,993	61,783
Slick	931	28,861
Graham	549	17,019
Rock (Twp. 30-4)	241	7,471
Clark (Twp. 31-5)	181	5,611
Eastman (Twp. 30-6 and 31-6)	701	21,731
Winfield-New Salem (Twps. 32-4 and 32-5)	3,437	106,547
Miscellaneous	768	23,808
Total	8,801	272,831
Other Counties—		
Reno	19	589
Sumner	21,439	664,609
Rice	2,156	66,836
Russell	2,616	81,096
Kingman	10	310
Harvey	42	1,302
Chautauqua	2,391	74,121
Elk	2,119	65,689
Montgomery	1,539	47,709
Wilson	216	6,696
Allen	662	20,522
Neosho	601	18,631
Lyon	1,604	49,724
Miami	2,414	74,834
Franklin	490	15,190
Douglas	69	2,139
Bourbon	15	465
Woodson	1,170	36,270
Linn	237	7,347
Anderson	1,910	59,219
Coffey	288	8,928
Chase	30	930
Labette	25	775
Total October	113,199	3,509,169
Total September	111,408	3,342,240
Difference	1,791	166,929

OKLAHOMA

Daily Average and Total Monthly Production in October, 1927

	Daily Av.	Month
Washington County	5,895	182,745
Nowata County	4,830	149,730
Rogers County	1,820	56,420
Osage and Eastern Kay Counties—		
Burbank	34,886	1,081,466
Osage, outside Burbank	28,551	885,081
Total	63,437	1,966,547
Tulsa County—		
Bird Creek, Owasso, etc.	3,714	115,134
Red Fork, Sand Springs, Bruner, Turkey Mountain and Fisher	2,755	85,405
Bixby, Leonard and Jenks	2,323	72,013
Broken Arrow and Coweta	1,059	32,829
Total	9,851	305,381
Okmulgee, Muskogee and North Okfuskee Counties—		
Mounds, Beggs, Hamilton, Switch, Youngstown	7,513	232,903
Bald Hill and Haskell	3,147	97,557
Morris-Boynton	2,668	82,708
Okmulgee	2,250	69,750
Tiger Flats, Henryetta, Schulter and Bartlett	2,220	68,820
Total	17,798	551,738
Okfuskee, Seminole and Hughes Counties		
Seminole—		
Seminole City	67,184	2,082,704
Earlsboro	169,262	5,247,122
Searight	27,674	857,894
Bowlegs	126,888	3,933,528
Little River	41,804	1,295,924
Total Seminole	432,812	13,417,172
Deaner-Lyons, etc.	4,006	124,186
Wewoka	13,160	407,960
Cromwell	11,327	351,137
Papoose-Gilcrease	5,998	185,938
Weleetka	908	28,148
Holm-Jarvis	1,011	31,341
Yeager	579	17,949
Miscellaneous	319	9,889
Total	470,370	14,581,370
Creek County—		
Cushing-Shamrock	17,973	557,163
Glen Pool, Sapulpa and Kiefer	7,704	238,824
Bristow, Kellyville and Depew	19,673	609,863
North Bristow and Pickett Prairie	3,232	100,192
Eastern Bristow or Slick	5,002	155,062
Total	53,584	1,661,104
Pawnee County—		
Cleveland	3,040	94,240
Keystone	2,483	76,973
Jennings	3,104	96,224
Otoe or Watchorn	1,492	46,252
Masham	30	930
Ralston	164	5,084
Total	10,313	319,703
Payne County—		
Yale, Quay and Ingalls	5,076	157,356
North Cushing	3,848	119,288
Deep Rock (22-18-3)	2,897	89,807
Total	11,821	366,451
Lincoln County—		
Stroud	1,234	38,254
Davenport	2,893	89,683
Kendrick	523	16,213
Total	4,650	144,150
Kay, Grant and Noble Counties—		
Blackwell	1,262	39,122
Otstot	1,061	32,891
Vernon	728	22,568
Deer Creek	1,867	57,877
Ponca City	724	22,444
Mervine	311	9,641
North Braman	2,761	85,591
South Braman	2,154	66,774
Hubbard	3,539	109,709
Thomas	2,754	85,374
Tonkawa	16,816	521,296
Billings	259	8,029
Miscellaneous	23	713
Total	34,259	1,062,029
Logan County—		
Marshall	2,366	73,346
Garfield County—		
Garber	11,188	346,828
Carter County—		
Healdton	14,834	459,854
Hewitt	9,499	294,469
Graham	4,993	154,783
Fox	3,604	111,724
Brock	979	30,349
Scholem Alchem	12,528	388,368
Total	46,437	1,439,547
Stephens-Cotton Counties—		
Loco-Milroy	2,238	69,378
Comanche	723	22,413
Duncan	5,181	160,611
Walters	970	30,070
Kilgore	202	6,262
Total	9,314	288,734
Jefferson County—		
Hambro	1,766	54,746
Caddo County—		
Cement	1,992	61,752
Garvin County—		
Robertson	2,270	70,370
Grady County—		
Knox	7,175	222,426
Beckham County—		
Sayre	46	1,426
Pontotoc County—		
Allen, Lloyd and Francis	4,468	138,508
Pottawatomie County—		
Pearson	3,914	121,334



TWIN DISC CLUTCHES

A New Oil Field Clutch

Because their design is mechanically correct, Twin Disc clutches can be adapted to extremes of load and conditions.

To the left is shown the new B-1-18 Power Take-off unit, built especially for the oil fields. It has a rated load capacity of 25,192 inch-pounds, and a maximum capacity of twice its rating.

The performance of this unit under the strenuous conditions demanded by oil field work is just one more example of Twin Disc efficiency. Complete specifications will be furnished on request.

TWIN DISC CLUTCH COMPANY
RACINE WISCONSIN

BAASH-ROSS PACKING ASSEMBLY and OVERSHOT

When packed off on a drill pipe coupling or tool joint, a strain is taken on the fishing string which engages the auxiliary springs under either the drill pipe coupling or tool joint. Continuing this strain the springs are pulled down, completely expanding the cylindrical rubber packing ring over the drill pipe coupling or tool joint. The pulling load is then taken by the overshot load springs and it is possible to circulate.

Complete data and instructions for using sent on request.

BAASH-ROSS TOOL COMPANY
LOS ANGELES CALIFORNIA
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LONG BEACH · · · BREA · · · VENTURA · · · TAFT · · · ROSECRANS

Approved for Field and Refinery Service

Stanley

Solid Woven Cotton Belting

5 Years, 12 Wells

A Report:

Power No. 6, 12 wells day and night, 136 ft.—14 in. Triple Stanley. On May 29, 1920. Replaced January 8, 1925. Heavy load—lots of water.

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San Francisco, Cal.

500 E. 3rd St.,
Los Angeles, Cal.
Hewitt Rubber Co. of Colo.
1238 Broadway,
Denver, Colo.

	Daily Av.	Month
Maud	1,720	53,320
Total	5,634	174,654
Marshall County—		
Madill	129	3,999
Total October	781,413	24,223,803
Total September	803,722	24,111,660
Difference	22,309	112,143

NORTH AND CENTRAL TEXAS
Daily Average and Total Monthly Production in October, 1927

North Central Texas—	Daily Av.	Month
Burkburnett	11,755	364,405
Electra	12,868	398,753
Iowa Park K. M. A.	3,504	108,624
Archer County	22,626	701,406
Clay County	546	16,926
Wilbarger	10,409	322,679
Montague County	9,743	302,033
Young County	10,421	323,051
Baylor County	87	2,697
Cooke County	5,426	168,206
Foard County	.....	.....
Total	87,380	2,708,780
Central Texas—		
Stephens County	8,051	249,581
Eastland County	7,829	242,699
Brown County	19,538	605,678
Callahan County	3,841	119,071
Coleman County	1,208	37,448
Comanche County	169	5,239
Throckmorton County	1,245	38,595
Jack County	856	26,536
Palo Pinto County	471	14,601
Shackelford County	5,166	160,146
Erath County	256	7,936
Jones County	1,328	41,168
Total	49,958	1,548,698
West Texas—		
Reagan County	25,385	786,935
Mitchell County	3,913	121,303
Winkler County	12,761	395,591
Howard County	3,533	109,523
Scurry County	40	1,240
Upton-Crane Counties	129,312	4,008,672
Crockett County	2,948	91,388
Glasscock County	88	2,728
Loving County	44	1,364
Pecos County	29,759	922,529
Ector County	21	651
Total	207,804	6,441,924
Panhandle—		
Carson County	7,909	245,179
Hutchinson County	67,633	2,096,623
Moore County	21	651
Wheeler	1,230	38,130
Gray	11,429	354,299
Potter	27	837
Total	88,249	2,735,719
East Central Texas—		
Powell	15,308	474,548
Mexia	8,987	278,597
Nigger Creek	1,345	41,695
Cedar Creek	557	17,267
Currie	589	18,259
Richland	743	23,033
Wortham	2,466	76,446
Total	29,995	929,845
Total all fields Oct.	463,386	14,364,966
Total all fields Sept.	452,127	13,563,810
Difference	11,259	801,156

NORTH LOUISIANA
Monthly Production for October

	Daily Av.	Month
Caddo	17,822	552,790
Homer	4,731	146,660
Haynesville	7,147	221,555
DeSoto-Red River	4,091	126,820
Elm Grove	672	20,800
Bellevue	1,222	37,880
Cotton Valley	5,176	160,455
Urania	9,383	290,875
Pleasant Hill	1,091	33,820
Total October	51,355	1,591,655
Total September	52,244	1,567,320
Difference	889	24,335

ARKANSAS
Monthly Production for October

	Daily Av.	Month
El Dorado	5,913	183,395
Smackover	87,333	2,707,325
Lisbon	2,991	92,720
Stephens	1,213	37,605
Nevada County	2,993	92,785
Bradley	112	3,470
Total October	100,555	3,117,300
Total September	101,099	3,032,970
Difference	544	84,330

GULF COAST
Daily Average and Monthly Production in October, 1927

District—	Daily Av.	Month
Boling	2,347	72,757
Batson	1,275	39,525
Blue Ridge	2,773	85,963
Barber Hill	962	29,822
Big Creek	4,051	125,581
Damon Mound	817	25,327
Dayton	231	7,161
Edgerly (La.)	2,213	68,603
Goose Creek	7,774	240,994
Humble	3,724	115,444
Hull	17,168	532,208
High Island	55	1,705
Jennings (La.)	1,261	39,091
Lockport (La.)	6,029	186,899
Markham	250	7,750
Nash	1,449	44,919
Orange	4,464	138,384
Orchard	82	2,542
Pierce Junction	10,241	317,471
Piedras Pintas	98	3,038
Spindletop	52,157	1,616,867
Saratoga	1,062	32,922
Sour Lake	4,067	126,077
South Liberty	2,111	65,441
Starks	537	16,647
Vinton (La.)	4,918	152,458
West Columbia	9,032	279,992
Welsh-Anse La Bute (La.)	26	806
*Miscellaneous	92	3,038
Total October	141,272	4,379,432
Total September	141,963	4,258,890
Difference	691	120,542

*Includes Nacogdoches, Washington counties, Kleberg County and scattered.

SOUTHWEST TEXAS
Daily Average and Monthly Production in October, 1927

Field—	Daily Av.	Month
Luling	15,604	483,724
*Mirando	9,491	294,231
Somerset	2,361	73,191
Callaham	24	744
Rockdale-Minerva	555	17,205
Lockhart	1,747	54,157
Total October	29,782	923,242
Total September	31,995	959,350
Difference	2,213	36,608

BURBANK MAINTAINS ITS ATTRACTIVENESS

(Continued from Page 75)

A total of 173 tracts have been sold aggregating 27,680 acres, or an average bonus price of $2,212 per acre, ranging all the way from $1.88 to $12,438 per acre. The $1.88 acreage has not been developed long enough to get a good line on its per-acre production, but one lease that was bought at $3.12 per acre before there was any production in the field has thus far produced 7,677 bbls. per acre in 6 years and 9 months, while the $12,438 acreage has yielded only 3,055 bbls. per acre in 3 years and 5 months.

The accompanying tables of production of the Burbank Field by lease and company were made up from the weekly production reports of one of the largest Oklahoma oil companies. According to this compilation, the Carter Oil Co. has produced 19,855,578 bbls. from 283 wells on 23 tracts. The Carter Oil Co. bought only one very high-priced tract, paying $1,025,000 for one quarter section which has produced 2,741,871 bbls. It has been the Carter company's largest producer in the field. The company paid a total of $4,602,300 in bonus. The Gypsy Oil Co. has produced $18,333,275 bbls. of oil from 201 wells on 17 tracts for which it paid $9,100,000 in bonuses. The Phillips Petroleum Co. is credited with 17,405,454 bbls. from 180 wells on 25 tracts for which it paid $9,099,000. The Phillips Petroleum Co. and Skelly Oil Co. jointly paid $10,022,100 in bonuses for 13 tracts which have produced 14,700,978 bbls. The combined production of all the Phillips Petroleum's leases, its half interest in the Phillips-Skelly leases and its half interest in the Phillips-Delmar lease is 26,135,586 bbls., while its production in the Kay County side of the field swells this total to 32,228,303 bbls., making the Phillips organization by far the largest producer in the field, having had approximately 22 per cent of the total gross Burbank output.

Contrary to general belief, the richest part of the Burbank Field has been in Kay County. The southwest quarter of Section 10-27-5 has produced over 24,000 bbls. per acre in 4 years and 5 months, while the most prolific quarter section on the Osage County side of the Field has been the northwest quarter of Section 24-27-5, which is credited with 18,906 bbls. per acre in 4 years and 7 months.

Kay County Extension

The Burbank Field was nearly three years old before the Kay County extension was proved to be productive. It had been believed quite generally that the Burbank sand would pinch out before the Kay County line was reached, and very good geologists had condemned all the territory in which the present Kay County extension lies. As a result some oil companies which had bought large blocks of eastern Kay County leases surrendered their leases at the expiration of their terms. It is evident that some one in authority in the Sapulpa Refining Co. did not agree with the geologists as that company drilled a well in the south half of the southwest quarter of Section 15-27-5 close to the Osage County line. It was a producer and that 80 acres has produced 1,122,697 bbls. of oil since January, 1923. John L. Dwyer owned a lease on the northwest quarter of Section 10-27-5, Kay County, and he made a contract with the Gordon Oil & Gas Co. whereby that company drilled the first well on the lease, Mr. Dwyer retaining a substantial interest in the property. The quarter section has produced 2,058,909 bbls. since May, 1923. Following the completion of the Sapulpa Refining Co.'s well there was a mad scramble for leases

and high prices were paid while the condemned acreage just east of the Kay County line sold at high prices, the tract just east of the Sapulpa Refining Co.'s lease bringing $1,325,000. According to the weekly production report from the field, the Kay County extension has made 24,293,314 bbls. since January, 1923.

TWENTY-FIVE HIGHEST PRICE BURBANK TRACTS AND THEIR PRODUCTION

Location—	Bonus Paid	Prod., Bbls.
Carter Oil Co.:		
NE 22-27-5	$1,025,000	2,741,871
Mid-Continent Petroleum Co.:		
SW 14-27-5	1,790,000	456,000
SE 14-27-5	1,955,000	791,048
Gypsy Oil Co.:		
NW 24-27-5	1,310,000	3,025,454
SE 24-27-5	1,600,000	2,309,372
NW 19-27-6	1,100,000	1,523,585
SE 19-27-6	1,050,000	1,755,228
NW 29-27-6	1,000,000	1,295,875
NE 23-27-5	1,195,000	1,687,144
Midland Oil Co.:		
SE 13-27-5	1,580,000	659,963
NW 14-27-5	1,990,000	489,287
Mid-Kansas Oil & Gas Co.:		
SE 15-27-5	1,325,000	1,436,557
Phillips Petroleum Co.:		
SW 11-27-5	1,765,000	2,260,889
NW 23-27-5	1,005,000	2,065,245
Phillips Petroleum-Skelly Oil Co.:		
SE 23-27-5	1,101,000	1,330,583
NE 24-27-5	1,245,000	2,155,501
SW 24-27-5	1,005,000	2,198,529
NE 25-27-5	1,335,000	882,485
NW 25-27-5	1,160,000	929,080
SW 19-27-5	1,585,000	1,974,719
Prairie Oil & Gas Co.:		
SW 13-27-5	1,825,000	1,074,538
Sinclair Oil & Gas Co.:		
NE 1-26-5	800,000	1,728,115
Prairie Oil & Gas Co.:		
SE 32-27-6	800,000	1,207,907
Phillips-Skelly:		
SE 26-27-5	805,000	663,759
Skelly Oil Co.:		
SW 23-27-5	740,000	1,056,350
Total	$32,131,000	37,699,084

Average bonus price per barrel of gross production, 85.2 cents. Average price per barrel received for the oil, $1.83.

TWENTY-FIVE LOWEST PRICE BURBANK TRACTS AND THEIR PRODUCTION

Location—	Bonus Paid	Prod., Bbls.
Carter Oil Co.:		
SE 5-26-6	$ 500	1,228,332
NE 9-26-6	500	724,461
NW 9-26-6	3,600	510,380
SW 9-26-6	3,000	954,923
SE 9-26-6	3,000	1,289,173
NW 16-26-6	5,400	978,958
SE 1-26-5	5,200	1,485,976
SE 31-27-6	3,000	913,883
Devonian Oil Co.:		
SW 5-26-6	700	1,007,684
Gypsy Oil Co.:		
NW 5-26-6	900	990,181
NE 31-27-6	1,300	1,617,351
Kewanee Oil Co.:		
NW 34-27-6	300	906,983
SE 34-27-6	300	585,103
NE 34-27-6	300	298,458
Laurel Oil & Gas Co.:		
NW 1-26-5	3,000	941,741
Phillips Petroleum Co.:		
SE 2-27-5	6,000	1,082,492
Phillips-Skelly:		
SW 25-27-5	6,100	891,396
Producers & Refiners Corp.:		
NW 31-27-6	2,100	1,524,862
Roxana-Marland:		
NW 6-26-6	6,600	606,756
NE 36-27-5	2,000	1,712,639
Simons and others:		
SW 1-26-5	3,100	467,546
NE 5-26-6	800	1,263,603
Twin State Oil Co.:		
NW 36-27-5	800	272,449
Sinclair Oil & Gas Co.:		
NE 1-26-5	5,800	1,165,720
SW 36-27-5	1,500	1,728,115
Total	$ 65,800	25,149,165

Average bonus price per barrel of gross production, .26 of 1 cent.

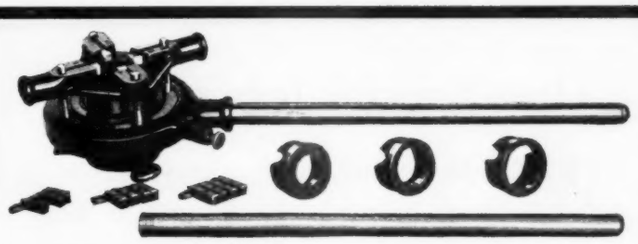
CRUDE PRODUCTION BY LEASES

Production of the Burbank Field in Osage and Kay Counties, Oklahoma, from its beginning in May, 1920, to November 1, 1927

OSAGE COUNTY

Galt Brown

Location	Date of first production—	Bonus price	Number wells	Total prod. (bbls.)
SW 20-26-6	February, 1927	$3,000	1	2,843
SW 8-26-6	October, 1927	1,900	1	693
	Total	$4,900	2	3,536
	Carter Oil Co.			
NE 12-26-5	September, 1922	$325,000	5	185,474
NE 20-26-6	March, 1925	42,000	16	366,709
NW 21-26-6	March, 1925	176,000	16	911,225
NW 12-26-5	November, 1922	500,000	2	5,528
SE 5-26-6	February, 1921	500	16	1,228,332
SE 8-26-6	March, 1922	351,000	16	775,904
NE 8-26-6	November, 1921	300,000	16	752,784
NE 9-26-6	November, 1920	500	9	724,461
NW 9-26-6	September, 1920	3,600	6	510,380
SW 9-26-6	January, 1921	3,000	12	954,923
SE 9-26-6	February, 1921	3,000	16	1,289,173
NE 13-27-5	September, 1924	230,000	16	672,782
NW 16-26-6	December, 1920	5,400	16	978,958
NW 13-27-5	September, 1924	405,000	16	286,007
SW 16-26-6	June, 1923	385,000	16	1,086,372
SE 1-26-5	January, 1921	5,200	12	1,485,976
SE 16-26-6	June, 1923	127,000	15	781,248
NW 11-27-5	September, 1924	310,000	16	1,216,030
NE 22-27-5	June, 1923	1,025,000	16	2,741,871



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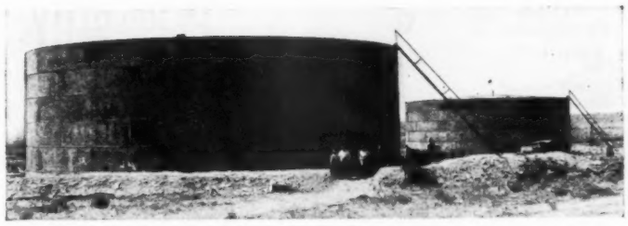

Col-Tex Refining Co., Colorado, Texas

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The two 31,000-barrel tanks shown above, one 20,000-barrel tank, one 5,000-barrel tank, two 6,700-barrel tanks, two 1,250-barrel tanks and one 500-barrel agitator were shipped, erected and ready for use within 60 days after the order was received.

This is an example of the service possible on Pittsburgh-Des Moines standard tanks which are carried in stock, fabricated and ready for shipment at both our Pittsburgh and our Des Moines shops. These tanks are of standard heights and capacities, and meet practically all storage requirements. Write or wire for estimates.

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613 Professional Bldg., Pittsburgh — 1227 Praetorian Bldg., Dallas — 915 Tuttle St., Des Moines

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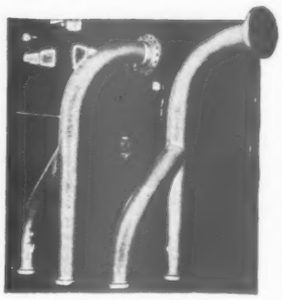
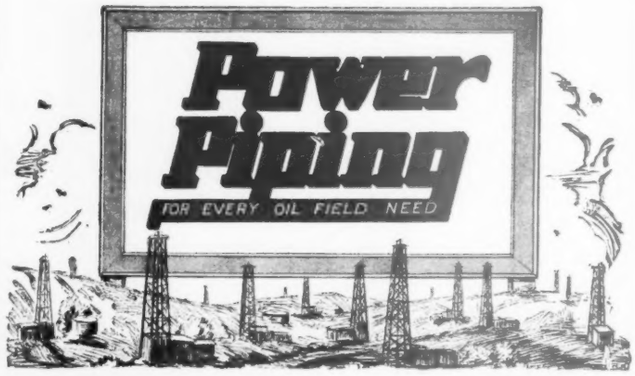
That Special Job

WE welcome such tasks — bringing to their solution years of experience in development, design and fabrication!



10" bend for high-power steam service with welded connection, outlet increased to 12" and vanstoned!



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Special High Pressure Automatic Injector

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Owing to the increasing demand in the oil fields for injectors to operate on higher pressures, this high pressure injector is recommended where boilers are operated at pressures to 200 pounds.

PENBERTHY INJECTOR COMPANY
Established 1886
Canadian Plant: WINDSOR, ONT., CAN.
1260 Holden Ave., DETROIT, MICH.

Location	Date of first production—	Bonus price	Number wells	Total prod. (bbls.)
NW 17-26-6	November, 1922	235,000	6	1,106,530
SW 31-27-6	February, 1921	7,100	15	871,869
SE 31-27-6	February, 1921	3,000	14	913,883
NE 33-27-6	August, 1922	160,000	1	9,159
	Total	$4,602,300	283	19,855,578
	Comar Oil Co.			
NE 2-26-5	November, 1922	$410,000	7	319,836
	Mid-Continent Petroleum Corp.			
SW 14-27-5	May, 1924	$1,790,000	16	456,000
NE 6-26-6	November, 1921	310,000	16	698,975
SE 14-27-5	May, 1924	1,955,000	16	791,048
NW 8-26-6	December, 1921	115,000	16	649,251
SW 8-26-6	April, 1922	300,000	15	434,427
NE 17-26-6	May, 1922	500,000	16	611,348
SE 17-26-6	June, 1923	11,000	11	516,176
	Total	$4,981,000	106	4,157,225
	Devonian Oil Co.			
SW 5-26-6	April, 1921	$700	16	1,007,684
	Gypsy Oil Co.			
NW 5-26-6	May, 1926	$900	15	990,181
NW 7-26-6	August, 1922	175,000	7	58,870
SE 3-27-5	May, 1924	151,000	7	98,944
NW 24-27-5	March, 1923	1,310,000	16	3,025,454
SE 24-27-5	September, 1922	1,600,000	16	2,309,372
NW 19-27-6	March, 1923	1,100,000	16	1,524,585
SE 19-27-6	September, 1922	1,050,000	16	1,755,228
SW 28-27-6	June, 1922	280,000	9	502,472
NW 28-27-6	December, 1922	205,000	1	2,492
SE 28-27-6	August, 1922	61,000	6	553,460
NW 29-27-6	September, 1922	1,000,000	16	1,295,875
NE 31-27-6	January, 1921	1,300	16	1,617,351
NW 32-27-6	January, 1922	226,000	16	915,986
NE 10-27-5	June, 1923	33,000	16	1,171,544
NE 7-27-6	December, 1926	42,000	1	40,784
SE 22-27-5	June, 1923	670,000	11	784,518
NE 23-27-5	June, 1923	1,195,000	16	1,687,144
	Total	$9,100,200	201	18,333,275
	Kewanee Oil & Gas Co.			
NE 4-26-6	March, 1922	$205,000	10	430,075
NW 34-27-6	October, 1926	300	8	906,982
SW 34-27-6	October, 1926	75,000	4	497,466
SE 34-27-6	December, 1926	300	4	585,166
SE 7-26-6	November, 1922	275,000	2	27,988
SE 18-27-6	May, 1924	285,000	14	280,292
NE 34-27-6	July, 1926	300	2	298,458
NE 3-26-6	July, 1927	645,000	3	92,295
	Total	$1,485,900	47	3,118,660
	Laurel Oil & Gas Co.			
NW 1-26-5	May, 1921	$3,000	16	841,741
	Lorraine Petroleum Co.			
SE 6-26-6	February, 1922	$100,000	15	529,613
	Midland Oil Co.			
SE 13-27-5	April, 1924	$1,580,000	16	659,963
NW 15-26-6	May, 1922	61,000	5	251,190
NW 14-27-5	May, 1924	1,990,000	16	489,287
	Total	$3,631,000	37	1,400,440
	Marland Oil Co.			
NW 3-26-6	November, 1926	$34,000	2	34,009
	Phillips Petroleum Co. and Delmar Oil Co.			
SE 10-27-5	June, 1923	$41,000	16	2,759,306
	Mid-Kansas Oil & Gas Co.			
SE 35-27-5	October, 1922	$665,000	13	894,721
SE 33-27-6	April, 1922	115,000	2	103,559
SE 13-27-5	June, 1923	1,325,000	16	1,436,557
NW 26-27-5	June, 1924	670,000	11	576,247
NW 22-26-6	June, 1926	29,000	3	20,995
SW 35-27-5	August, 1926	12,000	1	15,621
	Total	$2,816,000	46	3,041,750
	Phillips Petroleum Co.			
SE 2-27-5	July, 1925	$6,000	14	1,082,482
NE 11-27-5	March, 1925	335,000	16	916,343
NW 12-27-5	May, 1925	216,000	16	1,081,386
SW 12-27-5	February, 1925	335,000	16	1,285,017
SW 17-27-6	September, 1925	31,000	4	79,810
SW 11-27-5	May, 1924	1,765,000	16	2,260,889
NE 35-27-5	October, 1922	495,000	12	535,948
NW 20-27-6	June, 1924	75,000	6	105,168
NW 23-27-5	June, 1923	1,005,000	16	2,065,245
SW 32-27-6	October, 1921	305,000	16	1,040,329
SE 11-27-5	Septembeer, 1924	505,000	16	1,674,391
NE 14-27-5	September, 1924	225,000	16	285,611
NE 12-27-5	May, 1926	625,000	16	845,412
SE 17-27-6	September, 1924	54,000	16	782,076
NE 2-27-5	June, 1926	366,000	1	112,376
SE 20-27-6	July, 1924	24,000	7	228,005
SW 7-27-6	May, 1926	420,000	16	386,454
SE 7-27-6	May, 1926	222,000	12	719,831
SW 21-26-6	May, 1926	526,000	16	568,146
SE 20-26-6	May, 1926	110,000	9	140,138
SW 1-27-5	June, 1926	710,000	9	645,422
NE 29-26-6	January, 1927	50,000	4	18,818
SE 1-27-5	January, 1927	178,000	4	148,823
NW 7-27-6	November, 1926	455,000	11	285,421
SE 17-27-6	September, 1927	61,000	1	11,921
	Total	$9,099,000	286	17,405,454
	Phillips Petroleum Co. and Skelly Oil Co.			
NE 7-26-6	May, 1922	$155,000	8	292,688
SE 23-27-5	April, 1923	1,101,000	14	1,330,583
NE 24-27-5	March, 1923	1,245,000	16	2,155,501
SW 24-27-5	October, 1922	1,005,000	16	2,198,529
NE 27-27-5	June, 1922	1,335,000	16	832,548
NW 25-27-5	June, 1922	1,160,000	15	929,030
SW 25-27-5	February, 1922	6,100	16	891,396
SE 25-27-5	August, 1921	52,000	14	1,066,178
SE 26-27-5	November, 1922	805,000	13	663,759
NE 26-27-5	January, 1924	310,000	14	582,360
SW 19-27-5	September, 1922	1,585,000	16	1,974,719
NE 29-27-6	September, 1922	600,000	12	962,933
NW 30-27-6	April, 1922	663,000	16	820,759
	Total	$10,022,100	180	14,700,978
	Prairie Oil & Gas Co.			
SW 15-26-6	May, 1925	$25,000	4	42,404
SE 12-27-5	May, 1925	300,000	16	887,574
SW 8-27-6	October, 1925	40,000	1	532,865
NW 4-26-6	October, 1923	360,000	16	1,139,137
NW 10-26-6	October, 1921	200,000	5	714,702
SW 10-26-6	December, 1921	200,000	5	548,660
NE 30-27-6	March, 1922	700,000	16	942,216
SE 29-27-6	December, 1921	250,000	16	746,479
SE 32-27-6	March, 1922	800,000	16	1,267,907
SW 33-27-6	April, 1922	600,000	16	824,936
SW 13-27-5	May, 1924	1,825,000	16	1,074,528
	Total	$5,300,000	127	8,662,418
	Peters & Oliphant			
NW 17-27-6	October, 1923	$82,000	7	687,553
	Producers & Refiners and Marland Oil Co.			
NE 16-26-6	January, 1922	$136,000	13	479,895
	Producers & Refiners Corp.			
NW 31-27-6	November, 1920	$2,100	16	1,524,862
	Oliphant and others			
NE 20-27-6	January, 1927	$8,000	2	15,337
	George Parker			
NW 11-26-6	August, 1927	$75,000	3	93,772
SW 28-26-6	May, 1927	251,000	4	65,380
	Total	$326,000	7	159,152
	Roxana Petroleum Corp.			
SW 4-26-6	February, 1921	$251,000	11	1,152,640

Location	Date of first production—	Bonus price	Number wells	Total prod. (bbls.)
Roxana Petroleum Corp. and Marland Oil Co.				
NW 6-26-6	April, 1921	6,600	15	606,756
NE 36-27-5	May, 1920 (discovery lease)	2,000	12	1,712,639
SE 36-27-5	December, 1920	7,000	12	601,065
	Total	$15,600	39	2,920,460
Simons, Moore and others				
SW 1-26-5	February, 1922	$3,100	10	467,546
NE 5-26-6	April, 1921	800	15	1,263,613
	Total	$3,900	25	1,731,159
Seamans and others				
SW 17-26-6	February, 1926	$5,200	1	1,141
Sinclair Oil & Gas Co.				
NE 1-26-5	May, 1921	$5,800	15	1,165,720
NE 15-27-5	June, 1923	800,000	16	1,728,115
SW 36-27-5	October, 1921	1,500	17	1,490,838
NE 19-27-6	March, 1923	615,000	16	586,947
SW 20-27-6	March, 1923	415,000	16	774,804
SW 29-27-6	March, 1922	650,000	16	983,789
SE 29-27-6	June, 1922	410,000	16	1,137,536
NE 32-27-6	March, 1922	600,000	16	1,115,197
NW 33-27-6	June, 1922	300,000	15	532,968
	Total	$3,797,300	143	9,515,854
Skelly Oil Co.				
NW 28-26-6	December, 1926	$415,000	12	262,133
SW 2-27-5	April, 1925	10,500	8	91,616
SW 26-27-5	July, 1924	395,000	5	169,990
SW 23-27-5	June, 1923	740,000	15	1,056,350
NW 35-27-5	July, 1924	205,000	4	94,072
NW 2-27-5	April, 1926	68,000	2	117,815
SW 27-27-6	May, 1927	555,000	6	346,514
	Total	$2,388,500	52	2,138,490
Tidal Osage Oil Co.				
SE 4-26-6	October, 1921	$95,000	10	656,283
SW 6-26-6	February, 1921	206,000	16	834,569
	Total	$301,000	26	1,490,852
Tidal Osage Oil Co. and Carter Oil Co.				
SW 30-27-6	August, 1921	$26,000	15	1,897,112
Twin State Oil Co.				
SW 18-27-6	May, 1925	$605,000	16	702,084
NW 36-27-5	February, 1921	800	8	272,449
	Total	$605,800	24	974,533
The Texas Company				
NW 18-27-6	September, 1924	$141,000	16	465,181
NE 21-26-6	March, 1925	99,000	15	633,946
SE 21-26-6	May, 1926	321,000	13	365,504
NE 28-26-6	December, 1926	243,000	10	164,673
NE 3-27-5	February, 1927	6,500	1	4,407
SE 28-26-6	June, 1927	16,000	1	6,097
	Total	$826,500	56	1,639,808
	Total, Osage County	$60,405,200	1,824	122,600,351
KAY COUNTY				
Comar Oil Co.				
S ½ SW 4-27-5			1	5,061
N ½ SW ¼ 10-27-5—May, 1923			8	1,577,232
N ½ SW 15-27-5—April, 1923			8	1,378,629
S ½ NE 21-27-5—April, 1923			1	49,548
	Total		18	3,010,470
Dye & Tomlinson				
S ½ SW 15-27-5—January, 1923 (discovery lease)			8	1,122,687
Mid-Kansas Oil & Gas Co.				
N ½ NE 21-27-5—March, 1923			1	66,434
N ½ SE 9-27-5—May 1923			8	2,171,363
	Total		9	2,237,797
Phillips Petroleum Co. and Skelly Oil Co.				
W ½ SW 9-27-5—July, 1924			1	18,649
SE 16-27-5—April, 1923			7	227,064
W ½ NW 22-27-5—March, 1923			4	271,677
S ½ SW 22-27-5—June, 1925			1	112
E ½ NW 22-27-5—May, 1923			8	899,713
	Total		20	1,417,215
Twin State Oil Co.				
NW 15-27-5—April, 1923			15	1,750,871
Carter Oil Co.				
S ½ SW 10-27-5—June, 1923			3	2,267,255
SW NW 3-27-5—January, 1924			8	141,744
	Total		11	2,408,999
Mid-Continent Petroleum Co.				
NW 10-27-5—May, 1923			16	2,058,728
Gypsy Oil Co.				
W ½ NW 4-27-5—September, 1924			1	1,491
SE 4-27-5—May, 1923			16	1,368,472
E ½ NW and NE SW 16-27-5—May, 1923			1	2,054
	Total		18	1,372,017
Phillips Petroleum Co.				
N ½ and SE NW 3-27-5—May, 1924			2	13,002
NE and N ½ NW 9-27-5—August, 1923			19	3,379,119
S ½ SE 9-27-5—May, 1923			8	1,644,138
W ½ NE 16-27-5—August, 1923			2	356,851
	Total		31	5,384,110
Sinclair Oil & Gas Co.				
E ½ SW 9-27-5—May, 1923			5	562,127
George S. Bole				
E ½ NW 4-27-5—August, 1923			3	570,146
Laurel Oil & Gas Co.				
N ½ SW 4-27-5—August, 1923			5	288,537
Prairie Oil & Gas Co.				
S ½ NW 9-27-5—January, 1924			4	383,387
Pure Oil Co.				
E ½ NE 16-27-5—August, 1923			4	412,122
Roxana Petroleum Corp.				
NE 4-27-5—August, 1923			8	582,166
The Texas Company				
SW 3-27-5—October, 1923			16	691,734
	Total, Kay County		191	24,293,314
	Grand total, Burbank Field		2,015	146,893,665

FINLEY SCRUGGS PROMOTED

HOUSTON, Tex., Dec. 3.—Finley Scruggs, who for the past three months has been chief scout of the Humble Oil & Refining Co., has been promoted and transferred to McCamey, Tex., as head of the land department in the West Texas division. He has been succeeded by J. V. Boyce, scout and land man for the Humble working out of the Houston office. Mr. Scruggs formerly was with the Amarillo, Tex., office of the Humble but three months ago was promoted to the position of chief scout with offices at Houston.

BIDS ON LEASES

The commissioners of the Land Office of the State of Oklahoma will receive sealed bids until 2 o'clock p. m., on December 20, 1927, for oil and gas leases as follows: Kay County, W half SW, Section 36-28n-1w, 80 acres; Pottawatomie County, NE, Section 36-7n-4e, 160 acres. The commissioners will receive sealed bids until 2 o'clock p. m., on December 27, 1927, for oil and gas leases as follows: Kingfisher County, NW, Section 36-19n-5w, 160 acres.

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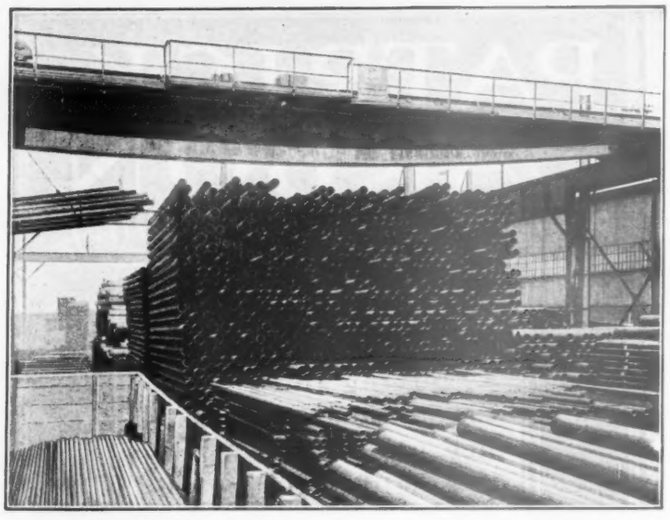

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SOUTHEASTERN COLORADO WILDCAT MAY THROW LIGHT ON GEOLOGY

By Tolbert R. Ingram

DENVER, Colo., Nov. 26.—A wildcat well being drilled in southeastern Colorado that is expected to throw considerable light on the geology of that region is the Parker Club's No. 1 Adams, in Section 32-34-56, near the town of Branson, in Las Animas County, and approximately 5 miles north of the New Mexico line. Southeastern Colorado has received considerable attention from the geological and land departments of several of the major companies within the past year, and while leasing has taken place on an extensive scale, few tests have been drilled, or have been carried down to a sufficient depth to give a very definite line on what may be expected from that area.

The Parker Club's No. 1 Adams is now reaching a stage where the log is becoming extremely interesting and may yield information of considerable importance as to the beds that underlie the region and the nature of the formation. The well is being drilled by the Parker Club of Colorado, Inc., with Cooper Brothers in charge of the operations. The operators, in view of the general interest taken in the area by the oil men, have taken a liberal stand in making available the log of the well and the analysis made of the cuttings.

The well is 14 miles west and approximately 7 miles north of a well drilled in Union County, New Mexico, several years ago by the United Oil Co. The granite was encountered in this well at 1,900 feet. It is approximately 42 miles southwest of No. 1 Johnson, in Section 30-27s-45, drilled by the Lamar Oil Co. and the Cosden interests to a depth of 5,026 feet, where it was abandoned. This well, which was near a volcanic plug, tested the Pennsylvanian and had some shows of oil and gas, but comparatively little sand that formed suitable reservoirs for oil. The Overland well, drilled several years ago on Section 36-20-66, near Pueblo, 100 miles northeast of the Parker Club's well, was abandoned at 3,945 feet in granite. Thirty-eight miles northeast of the Parker Club well, on Section 16-23-62, was located the Bent County Oil & Gas Co.'s No. 1 State, which was drilled to 4,010 feet, and showed favorable sedimentary conditions with some shows of oil and gas in the Pennsylvanian, though it was generally agreed that the test was not on structure.

Some of the things the oil companies desire to know concerning that general area are the approximate location of the ancient shore line, where it is expected that suitable reservoirs for oil and source material may be found together; the approximate area where the red beds rest on the granite; and whether the Cretaceous beds which generally overlie the region are in conformity with the Permian and lower Pennsylvanian beds. Charles E. Cooper, one of the operators in charge of the Adams well, says recent reports that the hole went through a hard formation which is identified as eroded granite, or granite wash, might be misleading in view of the fact that no hard formations that would indicate granite or granite wash have been encountered below 2,000 feet.

The following is a log of the well from the top to the present bottom at 3,630 feet, and analysis of the cuttings from 2,010 feet to 3,190 feet:

LOG OF ADAMS NO. 1
Well Record

Company: Parker Club, Inc., 808 Hellman Bank Building, Los Angeles, Calif.
Operators in charge: Cooper Brothers, Branson, Colo.
County: Las Animas, Colorado.
Farm: Verne Adams, Section 32-34-56.
Well: No. 1; drilling commenced April 17, 1927.

Casing Record

Size—	Ft.	In.
20-inch	228	9
15½-inch	757	6
12½-inch	1,425	
10-inch	2,318	
8¼-inch (underreaming)	3,550	

Drilling with cable tools.
Elevation above sea level at derrick floor: 6,125 feet.
Location of well: NE cor. of SW.

Formation Record

Formations—	Top	Bottom
Sandy brown soil	0	8
Yellow sandstone	8	140
Hard brown sandstone	140	170
Soft blue shale	170	180
Hard red sandstone	180	190
Water sand (water)	190	210
Gray lime	210	239
Gray slate	239	245
Gray lime	245	270
Gray slate	270	280
Gray lime	280	300
Red rock	300	320
Gray lime, hard	320	355
Gray slate	355	360
Gray lime, hard	360	372
Blue shale	372	382
Gray lime	382	385
Blue slate	385	390
Gray lime	390	403
Blue slate	403	415
Lime and shale	415	428
Gray slate	428	478
Gray lime	478	480
Gray slate	480	505
Gray lime	505	510
Red slate	510	520
White lime	520	535
Lime and gyp	535	540
Water sand (water)	540	545
Lime and gyp	545	555
Red sand, hard	555	580
Red sand rock	580	598
Red sand, hard	598	753
White lime, hard	753	757
Red rock and gyp	757	787
Red rock	787	800
White lime, hard	800	805
Red sand rock	805	847
Red rock, soft	847	870
Red sand, hard	870	877
Gray shale	877	885
Gray sand	885	895
White sand, hard	895	915
Red slate, soft	915	925
White lime (gas)	925	930
Sandy lime	930	975
Blue shale	975	980
Red lime	980	1,020
Gray sand	1,020	1,030
Red slate	1,030	1,035
Red sand rock	1,035	1,045
Red rock	1,045	1,073
Red sand rock	1,073	1,110
Red rock	1,110	1,138
White lime, hard	1,138	1,210
Red slate	1,210	1,215
Red lime	1,215	1,220
White lime, clear	1,220	1,235
Gray lime	1,235	1,260
Red sand rock	1,260	1,270
White lime	1,270	1,275
Red rock	1,275	1,300
Red and purple slate	1,300	1,315
Red lime	1,315	1,365
Red slate	1,365	1,390
White lime, sandy	1,390	1,425
Gray lime	1,425	1,445
Red lime	1,445	1,450
Gray lime, dark	1,450	1,460
Gray lime, light	1,460	1,465
Gray lime, dark	1,465	1,505
Water sand (water)	1,505	1,520
Gray lime, dark	1,520	1,562
Water sand (water)	1,562	1,567
Gray lime	1,567	1,575
Water sand (water)	1,575	1,590
Red lime	1,590	1,605
Red slate	1,605	1,622
Gray sand	1,622	1,630
White sand	1,630	1,650
White water sand	1,650	1,710

Colorado, Las Animas County, Parker Club, Inc., Adams No. 1 (Branson Dome), Section 32-34s-56w, NE cor. NE NE, elevation 6,125 feet. Examined by Fred E. Roth, Jr.

Depth	Classification	Remarks
2,010-2,020	Red gray arkosic sandstone	Cementing material is silica but there is a little calcareous material cement in the silica. This calcareous cement is probably dolomitic.
2,345-2,347	Gritty red shale	Grit is very fine and is subangular. Little quartz present that is cemented by a light lime.
2,685-2,741	Red granitic sandstone	Sandstone contains quartz feldspar and muscovite. Some light lime pebbles present and cementing material is slightly calcareous though largely siliceous. A little gritty red shale.
2,741-2,790	Red shale	Shale is gritty and very limy.
2,790-2,820	Red arkosic sandstone	Only slightly limy. Cementing material is silica. A little red shale as above is present. Grains of quartz and felspars subangular to subground.
2,820-2,830	Red shale	Shale contains muscovite. When wet has schistose appearance and is not limy.
2,830-3,025	Red shale	Shale as above. Considerable arkosic sandstone present.
3,028-3,060	Red arkosic sandstone	With some shale as above.
3,160-3,180	Red arkosic sandstone and red shale	Shale and sandstone as above.
3,180-3,190	Red arkosic sandstone and red shale	Same as above but proportion of shale to sandstone is considerably greater.

White sand	1,710	1,723
Gray lime, hard	1,723	1,726
Gray lime	1,726	1,728
Sandy lime	1,728	1,745
Water sand (water)	1,745	1,755
Sandy lime, sofe	1,755	1,790
Red sand	1,790	1,797
Red lime, sandy	1,797	1,812
Red slate	1,812	1,835
Red shale	1,835	1,840
Red and white lime	1,840	1,850
Red shale, hard	1,850	1,860
Red lime	1,860	1,895
Red shale, sandy	1,895	1,915
Red lime	1,915	1,950
Water sand (water)	1,950	1,979
Red lime, hard	1,979	1,982
Red lime, sandy	1,982	2,032
Red water sand (water)	2,032	2,068
Gray lime, hard	2,068	2,085
Red and white lime	2,085	2,090
Red shale shale	2,090	2,105
Red sandy lime	2,105	2,115
Red lime	2,115	2,122
Red sand	2,122	2,132
Red slate	2,132	2,145
Red lime, hard	2,145	2,165
Red slate	2,165	2,200
Red slate, sandy	2,200	2,250
Red sand	2,250	2,270
Lime and slate, broken	2,270	2,318
Gray lime	2,318	2,326
Red and white lime, hard	2,326	2,340
Red lime, hard	2,340	2,345
Red bed	2,345	2,347
Red lime	2,347	2,360
Red sandy lime	2,360	2,365
Red lime	2,365	2,442
Red lime, hard	2,442	2,482
Red lime and slate	2,482	2,517
Red slate	2,517	2,520
Red and white sand	2,520	2,530
Red and white lime, hard	2,530	2,538
Red slate	2,538	2,546
Sand and lime	2,546	2,565
Red lime, hard	2,565	2,575
Red sandy lime	2,575	2,650
White sandy lime	2,650	2,670
Red shale	2,670	2,685
Gray shale, sandy lime	2,685	2,715
Red slate and gray lime	2,715	2,741
Red lime	2,741	2,790
White lime, hard	2,790	2,820
Red slate, light	2,820	2,830
Gray lime, light	2,830	2,838
Gray lime and red shale	2,838	3,000
Gray lime	3,000	3,034
Gray lime and red shale	3,034	3,042
Gray lime, brakes, red slate	3,042	3,060
Gray lime, dark brakes, red slate	3,060	3,097
Gray lime	3,097	3,105
Gray lime, dark brakes, red slate	3,105	3,120
Red slate, dark brakes, white lime	3,120	3,170
Red slate	3,170	3,180
Gray lime, dark	3,180	3,195
Red slate and gray lime	3,195	3,245
Gray lime, dark	3,245	3,260
Gray lime, sandy	3,260	3,327
Gray lime, hard	3,327	3,352
Gray lime, soft, mixed blue slate	3,352	3,382
Gray lime and red slate, hard	3,382	3,390
Gray lime, blue and yellow slate	3,390	3,400
Blue lime, soft	3,400	3,405
White sand, hard	3,405	3,410
Gray lime	3,410	3,420
Sand lime	3,420	3,430
Black and blue shale	3,430	3,451
Black and blue slate	3,451	3,460
Blue slate and white lime	3,460	3,466
Blue and red slate	3,466	3,471
Red and white slate (some sand)	3,471	3,480
Red and white slate	3,480	3,500
White slate and gray sand	3,500	3,510
Red slate	3,510	3,520
Blue shale	3,520	3,532
Red shale and white lime	3,532	3,540
Blue and brown slate	3,540	3,550
Red slate, lime shells	3,550	3,564
White and blue slate	3,564	3,570
Blue slate	3,570	3,585
White sand	3,585	3,595
Slate	3,595	3,600
White sand and slate	3,600	3,623
Water sand (water)	3,623	3,630

HOUSE HEATING WITH GAS NEEDS STUDY

(Continued from Page 68)

content with the old procedure of per- er efficiency by at least 20 per cent than the ordinary atmospheric burner. I have this interesting series of tests, which will be available for reference to anyone concerned.

This correctly designed burner, utilizing either the refractory or iron alloy, radiant, should always be used in conjunction with a room clock thermostat, which lowers the temperature at night and restores it in the morning.

Such an installation gives the same luxurious service as the straight fired job, and while not quite as efficient, conversion operating costs have been economical enough to make house heating with gas a reality in the homes of a large number of our customers. These results have been found to be true in not only this company but numerous other companies in the industry, and also many artificial gas properties are now successfully securing this business.

Accepting the fact that house heating with good conversion equipment is a success, we men of this association are now in the position of a doctor who has at last discovered a remedy for his patients' ills. Are we to disclose to our mitting the plumber and hardware man to continue to sell wasteful and inefficient equipment for merchandising profit alone?

House Heating Departments

If you gentlemen, who are owners and operators of gas companies, do choose to enter this successful field, it will be first necessary to form house heating departments in your organizations. These are my suggestions as to the formation of such a department. An experienced engineer, specially trained in the science of gas heating, should first be employed. This man should spend his entire time interviewing architects, heating engineers and contractors, advising them which type of heating installation would be most suitable for their particular job. He should also prepare plans and estimates, and assist in the training of district salesmen in gas engineering.

It now remains to sell this house heating equipment. We have found the on-trial method, with no obligation to buy unless the appliance proves satisfactory, highly successful. The district salesman should secure these on-trial orders and refer them to the gas heating engineer, who then inspects the plant and makes the proper installation. In making these installations the boiler or furnace should be thoroughly cleaned and painted and the basement should always be set in order so as to remove as far as possible from the customer's mind the fact that he ever did use a solid fuel. After such installations have been made, and the heating season started, close watch should be kept on all gas consumptions. If consumptions are running higher than estimated, the gas heating engineer should trace the trouble not only to the burner but to the entire heating plant. He should also strongly advise house insulation, storm windows and weather stripping. It is imperative that the customer should recognize these high bills as due to faulty house or plant construction, and not due to the fault of the gas.

After a successful season has been closed, we should then check, repaint, and generally prepare the system for use during the season yet to come. The customer perceiving the interest taken in his welfare by the gas company is usually willing to pay a higher rate for this convenience and freedom from worry and labor. This has also been proven true even in manufactured gas areas.

Peak Load Bogey

In closing, I would like to drop back once more to our winter bogey, that much-discussed peak load and lack of gas when it is most needed. Let me stress the fact that our customer neither knows nor cares about peak load and load factor, he is only interested in the excellent and efficient service derived from automatic gas heating and will demand this convenience from us. It is now our problem to solve this peak and maintain our customer's confidence by continuing serving him with that dependability to which he has become accustomed. We can only accomplish this by controlling the use of gas an installing the proper appliances, which of course means active and enthusiastic house heating programs for us all. If our gas supply is low or is dwindling away, let us not calmly accept defeat but rather lay our plans for augmenting our present supply with artificial gas.

I will end by prophesying unlimited success to all gas companies with the courage to begin, maintain and expand house heating with gas.

TURKISH PETROLEUM REPORT

The directors of the Turkish Petroleum Co., Ltd., in their annual report for the year ended last December state that as the result of the recommendation of the geological survey party which completed its investigations in May of last year it was decided to carry out 10 test borings on the areas selected as holding out most promise of the economical production of crude oil, and at the end of the year drilling was being actively carried out on three of the areas chosen, namely, Kifri, Jabal, Hamrin and Kirkuk. Since the end of the financial year drillings for oil have also been completed in the areas of Qaiyarah and Tauq, and drilling is now proceeding satisfactorily in these areas, says the London Petroleum Times.

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NEW LOCATIONS IN TEXAS PANHANDLE AND NORTH AND WEST TEXAS FIELDS

TEXAS PANHANDLE FIRST REPORTS

Gray County

Magnolia Petroleum Co.'s No. 1 J. J. Wall, 330 feet south and west of the NE cor. of Section 162, Block 3, I. & G. N. Survey. Skelly Oil Co.'s No. 1 C. W. Bradford, 330 feet south and west of the NE cor. of Section 118, Block B-2, H. & G. N. Survey.

Gardner and others' No. 1 G. H. Saunders, 330 feet north and east of the SW cor. of Section 13, Block A-6, H. & G. N. Spartan Oil Co.'s No. 1 J. A. Hopkins, 330 feet south and 990 feet east of NW cor. of the W half of NE of Section 85, Block B-2, H. & G. N. Sun Oil Co.'s No. 1 W. Jackson, 330 feet south and west of NE cor. of Section 94, Block B-2, H. & G. N.

Hutchinson County

Skelly Oil Co.'s No. 2 Armstrong & Byrd, 892 feet north and 2,741 feet west of the SE cor. of the Mrs. F. J. Bellows Survey.

R. J. W. Oil Co.'s No. 2 E. Cockrell, 230 feet south and 300 feet east of NW cor. of the S half of SE of Section 3, Block B-3, D. & S. E.

Potter County

F. Allen and others' No. 1 W. H. Bush, 330 feet south and west of NE cor. of SW of Section 47, Block 9, B. S. & F.

Wheeler County

J. B. Clark and others' No. 1 J. W. Gordon, C of NE of NW of Section 107, Block 23, H. & G. N. Survey.

Vaughan and others' No. 1 M. E. Ackley, 660 feet south and east of NW cor. of SW of Section 20, Block 24, H. & G. N. P. Woodley's No. 1 J. Boyle, 660 feet north and east of SW cor. of Section 55, Block 13, H. & G. N.

NORTH CENTRAL AND WEST TEXAS FIRST REPORTS

Archer County

Atlantic Oil Producing Co. and Jeffers' No. 1 W. H. Taylor, 1,093 feet north and 2,770 feet west of the SE cor. of Section 29, Denton County School land, League 3, A-117. Burns and The Texas Company's No. 1 J. H. Turbeville-B, 2,490 feet north and 810 feet east of the SW cor. of Section 124, A. T. N. C. L. Consolidated Oil Co. & Continental Oil Co.'s No. 6 G. T. Netherton, 450 feet south and west of the NE cor. NW SE, Section 95, A. T. N. C. L. Survey. Stidham-Thrasher and others' No. 1 J. A. Medlin, 150 feet north and 2,500 feet west of the SE cor., Section 5, Block 4, H. & T. C. Survey, being 150 feet north and east of the SW cor. of the J. A. Medlin 129.6-acre tract. Burton & Grisham's No. 1 W. R. Farmer, 1,435 feet north and 1,233 feet east of the SW cor., Section 1, J. Poitevent Survey A-347. Consolidated Oil Co.'s No. 1 Stevens-Roach Co., 150 feet north and west of the SE cor. of the John McCraney Survey No. 4, A-289. Harry Hines and others' No. 1 W. R. Pace, 150 feet south and east of the NW cor., Section 114, Club Ranch Subdivision. C. B. Long and others' No. 1 A. F. Marsh, 150 feet south and east of the NW cor., Section 130, Club Ranch Subdivision. Murchison Oil Co. and others' No. 2 S. M. Cowan estate, 150 feet north and east of the SW cor. of the N half of Section 18, Jefferson County School Lands, A-240.

Shappell Oil Co.'s No. 18 L. F. Wilson-B, 150 feet north and 500 feet east of southwest corner of their lease "B" out of the S. P. R. R. Survey, A-1,276. Gray County Oil & Gas Co.'s No. 1 W. R. Estill, 150 feet north and west of the most easterly southeast corner of the N. H. Jose Survey, A-737. Ted Harris' No. 1 L. H. Farmer, 42 feet south and 360 feet east of the northwest corner of Lot No. 16, W. C. Winters Survey, A-663. Miss McChesney's No. 5 A. L. Bearden, 1,100 feet north and 550 feet east of southwest corner of the J. A. Hopkins Survey, A-2,086. John Menke's No. 1 Earl Bearden, 795 feet south and 150 feet west of the northeast corner of the west 30 acres of the SW of Section 3, John Riley Survey, A-364. Panhandle Refining Co. and Burton's No. 3 W. R. Farmer-B, 150 feet south and 451 feet west of the northeast corner of the west 80 acres of Section 1, North Anderson ranch. Staley-Wynne & Co.'s No. 1 Vigil Seay, 150 feet south and 850 feet west of the NE cor. of Section 97, Club Ranch Subdivision. Weldon & Lowry's No. 1 John Cuba, 150 feet north and east of the southwest corner of the north 25 acres of the southeast 50 acres (square) of Section 5, G. P. Meade Subdivision, L. M. Pasture.

Brown County

Selby Oil & Gas Co.'s No. 22 H. J. Ellis, 1,090 feet south and 450 feet west of the NE cor. of the H. J. Ellis 130-acre tract out of Section 3, S. A. & M. G. Survey, A-850. Wheelock & Collins' No. 4 M. L. Smith, 450 feet south and 150 feet east of the NW cor. of their lease out of Section 3, S. A. & M. G. Survey, A-850. George Lamb's No. 1 J. A. Gwathney, 150 feet south and west of the NE cor. of the southwest 40 acres of the David Harris Survey, A-529. George Nichols and others' No. 1 Mrs. C. B. Walton, 1,050 feet south and 450 feet east of the NE cor. of the A. Fleming Survey No. 47, and located in the G. E. Taylor Survey, A-1,654. Van Bibber & Lehman's No. 3 A. C. Evans, 518 feet north and 826 feet east of the SW cor. of the A. C. Evans 106.5-acre tract out of the James Woodward Survey No. 20. West Texas Land Co.'s No. 1 J. A. Gwathney, 150 feet south and east of the NW cor. of the east 40 acres of the north 80 acres of the David Harris Survey, A-529.

Coats & Wall's No. 1 J. I. Murphy, 150 feet north and west of the SE cor. of NW of Section 72, H. T. & B. B. Dozier's No. 1 J. T. Cason Jr.-B, 920 feet south and 1,760 feet west of the northeast corner of the W. G. Wilson Survey No. 64. Humble Oil & Refining Co.'s No. 9 J. Gilbreath, 451 feet south and 548 feet east of the northwest corner of their lease out of the R. F. DeBord Survey, A-2,136. Same company's No. 10 J. Gilbreath, 451 feet north and 548 feet east of the southwest corner of the R. F. DeBord Survey, A-2,136. Kone Production Co.'s No. 8 Roy Hickman, 150 feet north and 750 feet west of the most southerly southeast corner of their lease out of the Thomas Benson Survey, No. 783. Harry Mace's No. 1 A. J. Nation, 683 feet north and 788 feet west of the southeast corner of the A. White Survey No. 161. J. M. McMurray and others' No. 14 J. P. Newton, 600 feet south and 1,600 feet west of the northeast corner of the J. P. Newton 322-acre tract out of the William L. Swain Survey No. 145. Pandem Oil Corp.'s No. 1 A. D. Hutton, 1,083 feet south and 150 feet west of the northeast corner of the J. A. Nobles Survey, A-1,947. Phillips Petroleum Co.'s No. 9 C. Newsome, 743 feet south and 474 feet east of the northwest corner of the G. R. Davis Survey, A-2,106, and located in the H. Presslar Survey, A-2,040. A. Ratblott's No. 2 T. N. Jones, 450 feet south and 150 feet west of the NE cor. of Section 35, E. T. R. R. E. N. Schaffner's No. 6 E. D. Henson, 450 feet north and 250 feet east of the southwest corner of the G. Logan Survey, No. 147, A-600, being 450 feet north and 150 feet west of the southeast corner of his lease. Schrivener and others' No. 2 H. M. Trueheart, 450 feet north and 150 feet east of the southwest corner of the east 40 acres of the south 50 acres of the north 90 acres of the west half of the M. B. Lamar Survey No. 638, A-603. Selby Oil & Gas Co.'s No. 20 H. J. Ellis, 1,610 feet south and 150 feet west of the northeast corner of the H. J. Ellis 130-acre tract out of Section 3, S. A. & M. G., A-850. Same company's No. 21 H. J. Ellis, 750 feet south and 450 feet west of the northeast corner of the H. J. Ellis 130-acre tract out of Section 3, S. A. & M. G., A-850. E. L. Smith Oil Co.'s No. 17 M. L. Smith, 850 feet north and 450 feet west of the south-

east corner of their 60-acre lease out of Section 1, S. A. & M. G. Survey, A-849. H. A. Veale's No. 1 H. A. Newton, 550 feet north and 600 feet east of the most northerly southwest corner of the H. A. Newton 206-acre tract out of the Robert Mitchell Survey No. 141. Warren Development Co.'s No. 1 H. L. Allcorn, 1,224 feet south and 150 feet west of the northeast corner of the H. L. Allcorn tract out of the Roland Honeycutt Survey No. 623. Wheelock & Collins' No. 3 M. L. Smith, 150 feet south and 737 feet east of the northwest corner of their lease out of Section 3, S. A. & M. G., A-850. Advance Oil Co.'s No. 3 T. J. Hart, 450 feet southeast of the northwest line and 150 feet southwest of the northeast line of the T. J. Hart 181-acre tract out of the Sarah Ford Survey No. 20. United Royalties Co.'s No. 1 J. M. Barnes, 150 feet south and 1,000 feet west of the northeast corner of the N. Hawkenberg Survey No. 105.

Burnet County

Guffey & Gold's No. 1 Z. C. Warden, 150 feet north and east of the southwest corner of the east 20 acres of the William C. Reuger Survey.

Comanche County

T. E. Welsh and others' No. 1 E. O. Cosby, 1,000 feet north and 1,500 feet east of the southwest corner of the Eleanor Moore Survey No. 8.

Callahan County

Broderick & Calvert's No. 1 Ira Grantham, 700 feet south and 330 feet east of the NW cor. of the George Hancock Survey No. 385. Empire Gas & Fuel Co.'s No. 1 C. B. Snyder, 150 feet south and east of the NW cor. of the S half of the NE, Section 139, B. B. B. & C. Survey.

T. J. Garner's No. 1 Ace Hickman, 660 feet north and west of the SE cor. of SW of SW of Section 30, Deaf and Dumb Asylum land. Gibson & Johnson's No. 1-NJ Newman, 150 feet north and 600 feet west of the southeast corner of the north 100 acres of Section 134, University lands. Same company's No. 1-S C. B. Snyder, 150 feet south and west of the NE cor. of the NE of the NW of Section 139, B. B. B. & C. Same company's No. 1-SB C. B. Snyder, 150 feet north and west of the SE cor. of the NE of the NW of Section 139, B. B. B. & Co. Same company's No. 2-S C. B. Snyder, 150 feet north and east of the SW cor. of the NW of the NE of Section 139, B. B. B. & C. Same company's No. 3-S C. B. Snyder, 150 feet north and east of the SW cor. of the SW of the NW of Section 141, B. B. B. & C. Prairie Oil & Gas Co.'s No. 1 S. P. Long, 150 feet north and east of the southwest corner of the S. P. Long 10.5-acre tract out of the G. M. Vigal Survey No. 798. Reid & Groce's No. 2 E. C. Hood, 150 feet south and 450 feet west of the NE cor. of SW of Section 29, Deaf and Dumb Asylum Lands. Shadbolt & Creighton's No. 2 M. M. George, 150 feet north and west of the SE cor. of the NW of Section 71, Bayland Orphan Asylum Lands. Thomas & Goss' No. 1 S. M. Merrick, C of the E half of the SW of Section 21, B. B. B. & C.

Clay County

Carter-Fines and others' No. 1 E. Henderson, 150 feet south and east of the northwest corner of the east 40 acres of the south 80 acres of the E half of Section 2,615, T. E. & L.

Cooke County

N. H. Martin and others' No. 2 P. Bindle, 150 feet south and 312 feet east of the northwest corner of Block 81, town of Muenster. Sun Oil Co.'s No. 7 J. Hacker, 900 feet north and 400 feet west of the southeast corner of their lease out of Section 13, Thomas Scott Survey.

Coleman County

Magnolia Petroleum Co.'s No. 1 W. C. Henderson, 1,285 feet south and 150 feet east of the NW cor. of the E. T. R. R. Survey No. 79. Walter Gray's No. 1 J. E. Hefner, 200 feet south and west of the NE cor. of the south 50 acres of the J. E. Hefner 100-acre tract out of the A. Quigley Survey No. 739.

Anzac Oil Co. and others' No. 1 W. R. Gardner, 225 feet south and 200 feet west of the northeast corner of the B. Ferguson Survey No. 748. Donaldson & Miller's No. 1 W. H. Burson, 1,765 feet south and 1,688 feet west of the northeast corner of the W. H. Burson 200-acre tract out of the J. Leflore Survey No. 362. Kors and others' No. 1 Sealy & Smith, 1,320 feet north and west of the southeast corner of Section 127, Block 1, G. H. & H. Manhattan Oil Co.'s No. 1 M. Tye Overall, 1,400 feet south and 200 feet west of the NE cor. of Section 14, Block 1, G. H. & H. Sorrels & Jackson's No. 1 R. H. Belknap, 660 feet south and west of the NE cor. of Section 121, Block 1, G. H. & H.

Concho County

Parks & Lawson's No. 1 Shultz, 660 feet south and west of the NE cor., Section 325 (4), E. L. R. R. Survey.

Crane County

Gulf Production Co.'s No. 46 J. T. McElroy, 1,442 feet south and 3,630 feet east of the NW cor. of their lease out of Section 200, Block F, C. C. S. D. & R. G. N. G. R. R. Co. Survey.

Gulf Production Co.'s No. 45 J. T. McElroy, 1,442 feet south and 1,650 feet east of the northwest corner of their lease out of Section 200, Block F, G. C. & S. F.

Crockett County

Osage Oil Corp. and others' No. 1 H. M. Halff, 100 feet east of the middle of the Pecos River and 100 feet south of the north line of the west 160 acres of the south 480 acres of Section 70, Block 1, I. & G. N. Survey.

Gulf Production Co.'s No. 3 G. L. Thompson and others, 1,650 feet north of the south line and 150 feet east of the west line of their lease out of Section 71, Block 1, I. & G. N.

Eastland County

C. M. Root and others' No. 2 W. M. Kurklin, 500 feet south and east of the NW cor. SE, Section 62, Block 4, H. & T. C. Survey.

J. W. Hooser's No. 5 W. U. Fox, 755 feet north and 407.8 feet east of the SW cor. of Section 67, McLennan County School Land, League 3 and 4. J. W. Hooser's No. 6 W. U. Fox, 450 feet north and 673.4 feet west of the SE cor. of Section 67, McLennan County School Land, League 3 and 4. R. H. Lightfoot and others' No. 2 H. C. Earnest, 210 feet north and east of the middle of the west line of NW of Section 3, Block 4, H. & T. C. McLester Oil Co. and States Oil Co.'s No. 2 P. Thorp-B, 269 feet north and 1,728 feet east of the southwest corner of the W. C. Sartor Survey. Ed V. Parsons and others' No. 1 V. N. A. Blackwell, 800 feet south and 1,200 feet west of the NE cor. of Section 11, McLennan County School Land, League 2. Same company's No. 2 V. N. A. Blackwell, 600 feet south and east of the most easterly NW cor. of Section 7, McLennan County School Land, League 2. Belva Oil Co.'s No. 3 F. Good, 225 feet south and 305 feet west of the northeast corner of the south 171.65 acres of the F. Good tract out of the J. R. Stubblefield Survey. Independent Oil & Gas Co. and others' No. 1 Z. H. Been, 660 feet south and east of the northwest corner of the Z. H. Been 40-acre tract out of the M. D. Chaney Survey. McLester Oil Co. and others' No. 5 P. Thorp, 300 feet south and east of the northwest corner of the P. Thorp 65-acre tract out of the J. R. Stubblefield Survey. McLester Oil Co. and States Oil Co.'s No. 1 P. Thorp-B, 350 feet north and 300 feet west of the southeast corner of the W. C. Sartor Survey. Same company's No. 3 P. Thorp-B, 300 feet north and 1,200 feet east of the southwest corner of the W. C. Sartor Survey.

Howard County

Coyle-Concord Oil Co.'s No. 2 Dora Roberts, 1,830 feet south and 1,170 feet west of NE cor., Section 156, Block 29, W. & N. W. Survey. F. H. E. Oil Co.'s No. 1 Dora Roberts-C, 200 feet south and east of the NW cor. SW, Section 156, Block 29, W. & N. W. Survey. Same company's No. 1 Dora Roberts-D, 200 feet north and west of SE cor. NW, Section 136, Block 29, W. & N. W. Survey. Lee & Neely's No. 1 Harry Hyman, 330 feet north and 2,310 feet east of the SW cor., Section 61, Block 29 W.. & N. W. Survey. Sprague Oil Co.'s No. 1 Dora Roberts, 330 feet south and east of the NW cor., Section 156, Block 29,

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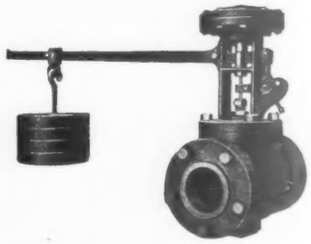

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W. & N. W. Survey. Ward Oil Co.'s No. 1 Dora Roberts, 150 feet south and west of NE cor. SW, Section 137, Block 29, W. & N. W. Survey.

Schermerhorn Oil Co.'s No. 1 Dora Roberts, 330 feet south and 2,310 feet west of the NE cor. of Section 157, Block 29, W. & N. W.

Irion County

F. E. Webb and others' No. 1 J. M. Nutt, 600 feet north and 300 feet west of the SE cor. NW, of the Gonzales County school land.

Jack County

J. Baldwin and others' No. 1 J. T. Ainsworth estate, 2,111 feet south and 1,925 feet east of the northwest corner of the J. T. Ainsworth 331.4-acre tract out of the S. M. Holderness Survey, A-1,532. Consolidated Oil Co. and The Texas Company's No. 1 Mrs. G. W. Fields, 1,500 feet south and west of the northeast corner of the John Balch Survey, A-41.

Jones County

Phillips Petroleum Co.'s No. 2 H. B. Vestal, 330 feet north and west of the SE cor. NW, Section 18, Block 19, T. & P. R. R. Survey.

Menard County

Carpenter & Robbins' No. 1 Kothmann, 150 feet south and east of NW cor. SW, Section 22, Indianola R. R. Survey.

Montague County

Arco Oil Co.'s No. 3 J. W. Maddox-B, 150 feet south and 450 feet east of the northwest corner of the south half of Lot No. 14, S. H. Arnold Survey, A-5.

McCulloch County

Ragsdale and others' No. 2 P. C. Dutton, 150 feet south and west of the NE cor. of SW of SE of Section 156, H. & T. C. Wakefield and others' No. 2 P. C. Dutton, 160 feet north and 640 feet west of the southeast corner of the northeast of the west half of the A. Froelisch Survey No. 585.

Palo Pinto County

Cranfill & Reynolds' No. 1 T. I. Gilbert, 660 feet south and 1,320 feet west of NE cor., Section 39, Block "A", T. & P. R. R. Survey. Same company's No. 2 T. I. Gilbert, 660 feet south and east of the NW cor., Section 38, Block "A," T. & P. R. R. Survey. T. G. Shaw's No. 1 C. Marlow, 400 feet north and 525 feet west of the SE cor., Section 19, T. & P. R. R. Survey, A-704. Camp Oil & Gas Co.'s No. 1 M. B. Costello, 150 feet southwest of the northeast line and 3,690 feet northwest of the southeast line of the R. R. Williams Survey, A-896. W. A. Patterson's No. 1 George C. Jones, 150 feet south and 450 feet west of the NE cor. of the Thomas Harrell Survey, A-236.

American Legion's No. 1 H. L. Moseley, 9,300 feet south and 522 feet east of the northwest corner of the Allen Williams Survey, A-886, being 522 feet south and east of the southwest corner of the north 1,000 acres. T. G. Shaw's No. 1 J. H. Gilbert, 8,330 feet south and 500 feet east of the northwest corner of the Allen Williams Survey, A-886, being 370 feet north and 500 feet east of the southwest corner of the north 1,000 acres. Leiser & Snebold's No. 1 J. S. Rector, 500 feet north and 350 feet east of the southwest corner of the north half of Lot No. 66, Burleson County School Land, League 3.

Pecos County

McMan Oil & Gas Co. and Marland Oil Co.'s No. 12 I. G. Yates, 860 feet south and 2,386 feet east of SW cor., Section 103, and located in Section 34½, Block 194, G. C. & S. F. R. R. Survey. Mid-Kansas Oil & Gas Co.'s No. 8 I. G. Yates-C, 1,354 feet south and 1,546 feet west of the NE cor. of W half of Section 60, Block 1, I. & G. N. Survey. Same company's No. 9 I. G. Yates, 802 feet south and 1,546 feet west of NE cor. of W half of Section 60, Block 1, I. & G. N. Survey. Same company's No. 10 I. G. Yates, 250 feet south and 1,546 feet west of NE cor. of W half of Section 60, Block 1, I. & G. N. Survey. The California Co.'s No. 4 M. A. Smith, 1,406 feet south and 1,565 feet east of NW cor., Section 35, Block 194, G. C. & S. F. Survey. Same company's No. 5 M. A. Smith, 1,406 feet south and 2,183 feet east of NW cor., Section 35, Block 194, G. C. & S. F. Survey. Same company's No. 6 M. A. Smith, 350 feet north and east of the SW cor., Section 35, Block 194, G. C. & S. F. Survey. Same company's No. 7 M. A. Smith, 2,028 feet north and 300 feet west of SE cor., Section 35, Block 194, G. C. & S. F. Survey. Robert Lee's No. 1 Joe Parker, 2,640 feet south and west of NE cor., Section 308, Block 10, G. H. & S. A. Survey.

Gulf Production Co.'s No. 3 M. A. Smith and others, 1,504 feet south and 937 feet west of the northeast corner of their lease out of Section 28, Block 194, G. C. & S. F. Survey. Same company's No. 4 M. A. Smith and others, 887 feet south and 937 feet west of the northeast corner of their lease out of Section 28, Block 194, G. C. & S. F. Survey. Same company's No. 5 M. A. Smith and others, 330 feet south and east of the northwest corner of their lease out of Section 28, Block 194, G. C. & S. F. Survey. Marland Oil Co.'s No. 5 I. G. Yates-A, 200 feet south and east of the NW cor. of E half of Section 60, Block 1, I. & G. N. Same company's No. 6 I. G. Yates-A, 200 feet south and 675 feet east of the NW cor. of the E half of Section 60, Block 1, I. & G. N. Same company's No. 7 I. G. Yates-A, 200 feet south and 1,150 feet east of the NW cor. of the E half of Section 60, Block 1, I. & G. N. Survey. Marland Oil Co.'s No. 8 I. G. Yates-A, 200 feet south and 1,625 feet east of the NW cor. of the E half of Section 60, Block 1, I. & G. N. Gibson Oil Corp.'s No. 1 R. R. Russell, C of NE of Section 69, Block 3, C. C. S. D. & R. G. N. G. R. R. Survey. Humble Oil & Refining Co.'s No. 4 M. A. Smith, 330 feet north and west of the SE cor. of Section 36, Block 194, G. C. & S. F. Survey. McMan Oil & Gas Co. and Marland Oil Co.'s No. 11 I. G. Yates, 275 feet south and 3,685 feet east of the SW cor. of Section 103, Block 194, G. C. & S. F. Survey, and located in Section 34½. Mid-Kansas Oil & Gas Co.'s No. 12 I. G. Yates-A, 510 feet north and 2,227 feet west of the SW cor. of Section 60, Block 1, I. & G. N. Survey, and located in the I. G. Yates Survey, A-8,195. Same company's No. 13 I. G. Yates-A, 285 feet south and 785 feet west of the SW cor. of Section 60, Block 1, I. & G. N., and located in the I. G. Yates Survey, A-8,195. Same company's No. 14 I. G. Yates-A, 250 feet south and 1,952 feet west of the NW cor. of Section 59, Block 1, I. & G. N., and located in the I. G. Yates Survey, A-8,195. Same company's No. 13 I. G. Yates-B, 200 feet north and 1,625 feet east of the NE cor. of the W half of Section 60, Block 1, I. & G. N. Survey, and located in Section 61. Same company's No. 14 I. G. Yates-B, 200 feet north and 1,150 feet east of the NE cor. of the W half of Section 60, Block 1, I. & G. N., and located in Section 61. Same company's No. 15 I. G. Yates-B, 200 feet north and 675 feet east of the NE cor. of the W half of Section 60, and located in Section 61, Block 1, I. & G. N. Same company's No. 16 I. G. Yates-B, 200 feet north and east of the NE cor. of the W half of Section 60, and located in Section 61, Block 1, I. & G. N. Same company's No. 17 I. G. Yates-B, 200 feet north and west of the NE cor. of the W half of Section 60, and located in Section 61, Block 1, I. & G. N. Survey. Same company's No. 6 I. G. Yates-C, 250 feet north and 2,041 feet east of the SW cor. of Section 60, Block 1, I. & G. N. Survey. Same company's No. 7 I. G. Yates-C, 200 feet south and west of the NE cor. of the W half of Section 60, Block 1, I. & G. N. Roxana Petroleum Corp.'s No. 4 J. H. Tippett, 200 feet south and 1,175 feet east of the NW cor. of Section 102, Block 194, G. C. & S. F. Simms Oil Co.'s No. 4 M. A. Smith, 275 feet north and 3,685 feet east of the SW cor. of Section 103, Block 194, G. C. & S. F. B. J. Spikes' No. 1 George Brown, 150 feet south and east of the NW cor. of the SE of Section 8, Block 3, H. & T. C.

Runnels County

Royal Petroleum Co.'s No. 1 A. C. Willingham, 150 feet south and west of the NW cor., Lot 26, Domingo Diaz Sur-

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Technicians prove that frictional losses in gas engines range from 10% to 30% of the rated horsepower independent of actual load. That clearly indicates the need for Hills-McCanna Force Feed Lubricators.

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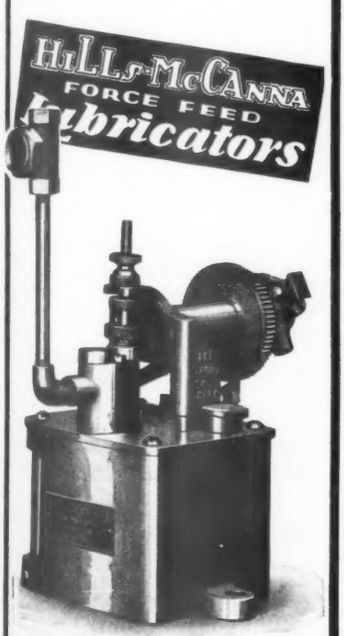

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vey No. 532, being 150 feet south and west of NE cor. of Lot No. 25, Watchorn Oil & Gas Co.'s No. 1 J. L. King, 660 feet south and 3,100 feet west of SW cor. of Lot No. 25, Domingo Diaz Survey No. 532, and located in the George W. Dwyer Survey No. 482, being 660 feet south and 470 feet east of NW cor. of the J. L. King tract.

Empire Gas & Fuel Co.'s No. 1 C. C. Gray, 660 feet north and 2,092 feet west of the SE cor. of Section 147, E. T. R. R.

Shackelford County

S. S. Kouri and others' No. 1 J. F. Beam, 500 feet south and west of the NE cor. of SW of Section 11, Block 3, H. & T. C. Texas Unity Oil Co.'s No. 2 Russ-Webb, 150 feet south and west of the NE cor. of the SW of Section 22, Block 11, T. P. R. R.

Stephens County

Barnhart & Conway Brothers' No. 1 W. J. Gardenshire, 660 feet north and 1,000 feet east of the SW cor. of Section 47, Block 6, T. P. R. R. J. L. Thompson and others' No. 1 George Riddle and others, 200 feet south and 250 feet west of the NE cor. of the S half of NW of Section 45, Block 6, T. P. R. R.

Upton County

The Texas Company's No. 5 J. M. Perry, 330 feet south and 2,766 feet east of NW cor., Section 3, G. C. & S. F. Survey, A-230.

Wilbarger County

Fain-McGaha Oil Corp.'s No. 1 W. T. Waggoner-N, 205 feet north and east of SW cor. of N half of NE, Section 17, Block 4, H. & T. C. Survey. E. B. Lawson's No. 1 W. T. Waggoner-A, 205 feet north and west of SE cor. SW SE, Section 25, Block 4, H. & T. C. Survey. The Texas Company's No. 1 W. T. Waggoner-D, center of the north 320 acres of Section 43, M. E. P. & P. Survey.

Humble Oil & Refining Co.'s No. 21 W. T. Waggoner-H, 460 feet south and west of the NE cor. of the W half of the SW of Section 46, Block 4, H. & T. C. H. Muse and others' No. 1 W. T. Waggoner, 205 feet south and east of the NW cor. of the NE of the SW of Section 17, Block 4, H. & T. C. Same company's No. 1 W. T. Waggoner-A, 205 feet north and east of the SW cor. of the SE of the SW of Section 24, Block 4, H. & T. C. The Texas Company's No. 4 W. T. WaggonerB, 210 feet south and 255 feet east of the NW cor. of Section 17, Block 4, H. & T. C. Same company's No. 1 W. T. Waggoner-C, 205 feet north and west of the SE cor. of the NE of the SE of Section 25, Block 4, H. & T. C.

Wichita County

Magnolia Petroleum Co.'s No. 137 H. Reilly, 3,425 feet north and 200 feet east of the SW cor. of the J. Ellis Survey, A-175. Same company's No. 11 F. P. Warren, K. & G., 550 feet north and 850 feet west of SE cor. of the F. P. Warren 320-acre tract out of the William Kepler Survey, A-170. W. J. Moran's No. 13 F. P. Warren, 150 feet north and 850 feet west of SE cor. of their 40-acre lease out of the William Kepler Survey, A-170. Same company's No. 14 F. P. Warren, 150 feet north and east of SW cor. of their 40-acre lease out of the William Kepler Survey, A-170. Dale Oil Corp.'s No. 5 Kemp & Kempner-B, 165 feet south and 210 feet east of NW cor. of E half of Section 17, Kemp Wichita Valley Lands. Henry Hobbs' No. 2 J. A. Watkins, 202 feet north and 150 feet east of SW cor. of east 60 acres of Section 46, Kemp Wichita Valley Lands. Shappell Oil Co.'s No. 10 Kemp & Kempner-A, 1,000 feet north and 150 feet west of the SE cor., Section 19, Kemp Wichita Valley Lands.

John O'Neil's No. 1 A. A. Carl, 450 feet north and 150 feet west of the SE cor. of the W half of Section 46, Red River Valley Lands. Continental Oil Co. and others' No. 1 G. B. Ancell, 150 feet south and east of the NW cor. of the NE of Section 10, Block 7, H. & T. C. Cooper & Mishler's No. 13 J. L. and T. J. Waggoner, 192 feet north and 150 feet east of the most southerly SW cor. of Section 2, G. C. & S. F. Survey, A-772. O'Donohoe & Gates' No. 1 W. L. Hodges, 3,400 feet south and 150 feet west of the northeast corner of the H. T. & B. Sur-

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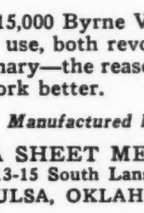

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vey No. 1, A-139, being 150 feet south and west of the northeast corner of Lot No. 7, Hodges Subdivision. W. H. Hammon's No. 1 S. H. McCarty, 600 feet south and 1,500 feet west of the northeast corner of the W. R. Eaves Survey, A-447, being 150 feet north and west of the southeast corner of the west 40 acres of the east 60 acres. W. H. Hammon and others' No. 2 T. F. Mitchell, 200 feet north and 150 feet east of of the southwest corner of Lot No. 3, Mitchell Subdivision, P. Castleman Survey, A-36. Magnolia Petroleum Co.'s No. 12 J. A. Watkins-A, 2,000 feet south and 700 feet east of the NW cor. of Section 46, Kemp Wichita Valley Lands. The Texas Company's No. 337 W. T. Waggoner, 1,270 feet north and 652 feet west of the SW cor. of Section 2, Seale & Morris Survey, A-535, and located in Section 148, H. & T. C. Survey, A-784. Vergate Oil Co.'s No. 1-Deep, J. A. Watkins, 1,250 feet north and 150 feet east of the SW cor. of Section 46, Kemp Wichita Valley Lands. A. T. Wolfe's No. 1-Deep, B. N. Ferguson, 150 feet north and west of the southeast corner of Lot No. 12, J. T. Lewis Survey, A-462.

Winkler County

Southern Crude Oil Purchasing Co.'s No. 3 Grisham-Hunter, Tract 89-A, 660 feet north and 2,310 feet east of SW cor., Section 35, Block B-5, School Land. Same company's No. 4 Grisham-Hunter, Tract 89-A, 165 feet north and 1,650 feet east of SW cor., Section 35, Block B-5, School Land. Same company's No. 7 Ida Hendrick, Tract 88-C, 330 feet south and 1,650 feet east of NW cor., Section 28, Block B-5, School Land.

V. T. Bolin and others' No. 1 E. E. Brown and others, 2,490 feet south and east of the NW cor. of Section 4, Block B-5, School Land. Magnolia Petroleum Co.'s No. 3 Ida Hendrick, 990 feet south and 1,650 feet west of the NE cor. of Section 29, Block B-5, School Land. Southern Crude Oil Purchasing Co.'s No. 2 Grisham-Hunter, Tract-89-A, 1,980 feet north and 2,310 feet east of the SW cor. of Section 35, Block B-5, School Land.

Young County

The Texas Company's No. 1 O. B. Stowe, 450 feet south and 900 feet east of the NW cor. of the north 100 acres, SE Section 2, J. Poitevent Survey, A-2,125. Paull Oil Co.'s No. 5 J. E. Morrison Co., 620 feet south and 200 feet east of NW cor. of the E. Sherill Survey, A-271. Same company's No. 6 J. E. Morrison Co., 1,040 feet south and 200 feet east of NW cor. of the E. Sherill Survey, A-271. Pitzer & West's No. 4 J. E. Morrison Co., 1,000 feet south and 200 feet east of NW cor. of the east 40 acres of the west 60 acres of the J. E. Morrison Co.'s 122-acre tract out the the E. Sherill Survey, A-271. Same company's No. 1 J. T. Thigpen, 173.5 feet north and 200 feet west of SE cor. of the Paul Pier Survey, A-219.

Moutray Oil Co.'s No. 1 J. W. Boozer, 300 feet north and 3,000 feet east of the southwest corner of the north 124.5 acres of the Jacob Garrett Survey, A-108. Nash & Windfohr's No. 3 W. B. Hinson, 545 feet north and 200 feet west of the southeast corner of the W. B. Hinson 47.5-acre tract out of the P. Pier Survey, A-219. Same company's No. 2 John Ware, 541 feet south and 200 feet east of the northwest corner of the west 29.5 acres of the John Ware 69.5-acre tract out of the J. W. Manning Survey, A-188.

Corrected Locations

Pecos County: Allsman & Bell's No. 11 Pecos River Bed, 340 feet north and 4,997 feet east of NW cor. of the T. I. & M. Co. Survey No. 545, A-1,325, and located in the bed of the Pecos River, being 30.5 feet from the west bank.

Potter County: Prairie Oil & Gas Co.'s No. 1 Lee Bivins, 660 feet south and 330 feet west of SE cor., Section 39, Block M-20, G. & M. Survey.

Wichita County: O'Donohoe & Gates' No. 1 W. L. Hodges, 2,400 feet south and 150 feet west of NE cor. of the H. T. & B. Survey No. 1, A-139, being 150 feet south and west of NE cor. of Lot No. 7, Hodges Subdivision.

Winkler County: Southern Crude Oil Purchasing Co.'s No. 2 Grisham-Hunter,

"Satisfactory Results"

In the July 7 issue of The Oil and Gas Journal, the following advertisement appeared in the Classified Section:

"WEST TEXAS"

PECOS COUNTY—4 sec., lease 10 yr., NE part of county, $1.50 bonus, rentals 50 cents. 2 sec. W part of county, 10 yr., $1, 50 cents. One block of 10 lots, full sized, Fort Stockton. For the entire lot, $400, cash or your terms at 8 per cent.

720 A. Block 12, adjoins Humble, Roxana & Std. of Calif. about 2 miles from Pecos river and 20 N. E. Yates Field. 10 yr. lease, $7.50 with 50 cents rentals.

Brewster County. I have a number of scattered sections at $2.50 to $4 fee, unleased in the play. Will sell one or more. Also 16-640A. ranch, house, well, springs, creek; excellent hunting. $2.25 per acre. $10,000 will handle; unleased for oil. The cheapest buy in all West Texas. 200 A. fee, unleased $2.75 per acre.

Presidio County. 9,500 A. 10 yr. lease, 20 cents bonus, 10 cents rentals. 2 sections, fee, $2.50.

Terrell County. 7 sections, fee, leased for oil to expire July, 1928. $2.25 per A.

Oil operators—I have 60,000 A. solid body, NE, Brewster County, 10 yr. paid up lease, no drilling obligation. Adjoins large company holdings. Good geology. Price $1.25, will sell 15,000 A. and up.

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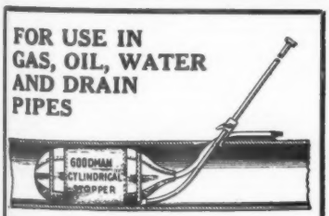


Safety Gas Main Stopper Co.
523 Atlantic Ave.,
Brooklyn, N. Y.

Tract 89-A, 1,320 feet north and 2,310 feet east of SW cor., Section 35, Block B-5, School Land.

Young County: Pitzer & West and others' No. 3 W. B. Hinson, 643 feet north and 200 feet west of SE cor. of the Paul Pier Survey, A-219.

In Archer County: Shappell Oil Co.'s No. 10 L. F. Wilson-B, 450 feet north and east of the SW cor. of the SE of the L. F. Wilson 160-acre tract out of Section 4, S. P. R. R., A-1,276.

In Brown County: Bush & Spinney's No. 1 J. L. Richardson, 550 feet north and 1,375 feet east of the SW cor. of the S. A. & M. G. Survey, A-1,233. Phillips Petroleum Co.'s No. 8 C. Newsome, 447 feet south and 494 feet east of the northwest corner of the G. R. Davis Survey, A-2,106.

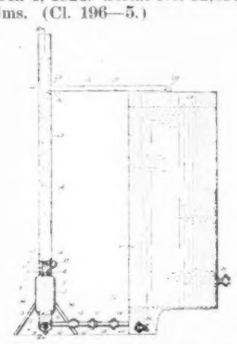
In Callahan County: Shadbolt & Creighton's No. 1 M. N. George, 150 feet north and east of the SW cor. of the SE of the NW of Section 71, Bayland Orphant Asylum Land.

In Jack County: Connell & Wixon's No. 1 J. R. Sloan, 150 feet south and east of the northwest corner of the north 50 acres of the east 100 acres of the J. R. Sloan tract out of Section 1, J. W. Williams Survey, A-877.

In Pecos County: Kirby Petroleum Co. & Edson's No. 1 J. H. Tippett, 847 feet north and 250 feet west of the southwest corner of the Runnels County School Land, A-2,169, and located in Section 108, Block 194, G. C. & S. F. Survey.

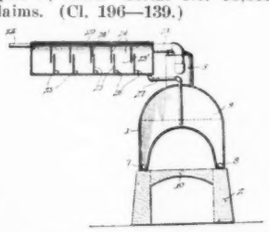
Recent Patents

1,646,481. Oil-Purifying Apparatus. Forrest H. Hodge, Lodi, Ohio. Filed March 6, 1926. Serial No. 92,694. Five claims. (Cl. 196—5.)



1. Oil-purifying apparatus, comprising an oil reservoir, a fire box, a water jacket surrounding the directly heated portion of said fire-box, a pipe communicating at one end with the reservoir and at the other end with the lower end of the water jacket, a burner disposed within said fire-box, a smoke stack, a water stand pipe disposed entirely within the said stack, means for connecting the stand pipe with the upper end of said water jacket, and means connecting the upper end of the stand pipe within the stack and leading to and within the upper end of the reservoir.

1,646,448. Oil-Distilling Apparatus and Method. Edward C. D'Yarmett, Wichita Falls, Tex., assignor of one-half to O. K. Herndon, Kansas City, Mo. Filed April 2, 1926. Serial No. 99,311. 6 Claims. (Cl. 196—139.)



1. In a dephlegmator for removing entrained liquid from hydrocarbon vapors, a casing, and a plurality of alternately arranged upwardly and downwardly extending baffles in said casing forming a tortuous course having successive upwardly and downwardly directed portions, said baffles arranged to vary in-

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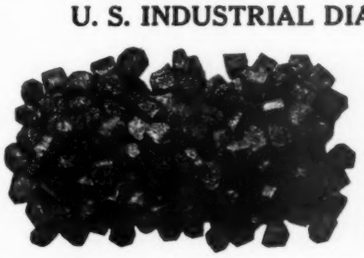

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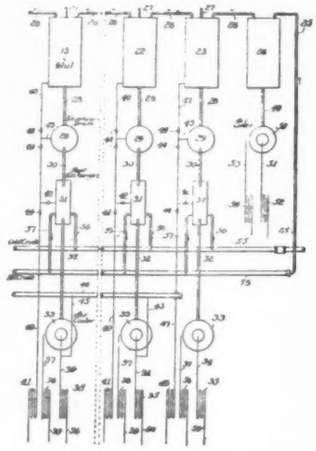
termittently the velocity of the vapor and liquid and being inclined with respect to said casing whereby to provide an extended course in the casing.

1,644,324. Art of Continuous Distillation of Hydrocarbon Oils. James Ray Carringer, Elizabeth, N. J., assignor to Standard Development Co., a corporation of Delaware. Filed May 6, 1921. Serial No. 467,456. 2 Claims. (Cl. 196—106.)



1. In a battery of continuous stills, a plurality of stills arranged in series, a fractional condenser connected to each still, a plurality of condensers, means for conducting vapors from the fractional condensers thereto, a common pressure equalizing chamber, means for establishing communication between the vapor spaces of the fractional condensers of the stills and the pressure equalizing chamber and means for flowing oil through the stills in succession.

LEGALS

NOTICE OF RECEIVER'S SALE OF OIL AND GAS LEASE

Notice is hereby given that the undersigned Receiver will, under and by virtue of a certain judgment and decree of foreclosure made and entered by and in the District Court of Creek County, Oklahoma, in Cause No. 12673, wherein the Tulsa Rig, Reel & Manufacturing Company was plaintiff and Lawrence Anderson, Executor of the Estate of Clint Anderson, deceased, et al, were defendants and cross-petitioners, and by virtue of an order of sale issued out of said court and to me directed, on the 5th day of November, 1927, I will on the 10th day of December, 1927, at the hour of 10 o'clock A. M. offer for sale at public auction, at the North front door of the Courthouse in the City of Okmulgee, County of Okmulgee, Oklahoma, to the highest and best bidder for cash, free and clear of all liens and incumbrances, the following described property, towit:

An oil and gas mining lease on and covering the Northeast quarter of the Southeast quarter of Section 22, Township 15 North, Range 11 East, Okmulgee County, Oklahoma,

known as the Tabor lease, together with all of the oil wells, oil well casing, tubing, rods, pumps, engines, boilers, power plants, rigs, derricks, machines, machinery, houses and equipment of every kind and character thereon and thereunto belonging.

Said sale will be made subject to confirmation by the District Court of Creek County, Oklahoma, and possesion of said oil and gas mining lease, together with all of the appurtenances thereon and thereunto belonging, will be delivered to such purchaser immediately upon approval of said sale.

Full information concerning the five wells on said lease, the amount of production, material and equipment thereon may be had on application to the undersigned at his office in the city of Okmulgee, Oklahoma, or to Mosier & Mosier, Attorneys, Muskogee National Building, Muskogee, Oklahoma.

I. H. COX,
Receiver.

TRIBAL OSAGE OIL LEASES AT PUBLIC AUCTION

December 12, 1927, by United States Government.

December 12, 1927, at Pawhuska, Oklahoma, about 19,360 acres will be offered for oil leases in quarter section tracts. Bids will be for bonus in addition to royalties, 25% payable on day of sale, balance in three annual installments, with acceptable security. Within advertised area, there are about 9,903 oil wells producing from one barrel to 1,000 barrels each, the total daily production for September, 1927, being about 62,000 barrels; also there are about 60 wells drilling. All lands are now leased separately for gas. Blue print maps of area advertised, showing tracts producing oil or gas, can be had for fifty cents each, also logs of producing oil or gas wells for twenty-five cents each well. Write U. S. Superintendent, Osage Agency, Pawhuska, Oklahoma, for maps, logs or other information.

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Tulsa, Oklahoma.

"Gentlemen:

"Enclosed cash for year's subscription. As I am on the jump most of the time always buy The Oil and Gas Journal where it is handy. You will never know how many customers I have got for you as you give it to us straight, and I feel like I am doing my friends in the oil business a real kindness to tell them about The Oil and Gas Journal.

"In your issue of April 28 you carried some very pretty work by Mr. Edwards, geologist for the Exploration Co. of Texas, which showed the stratigraphic position of the Big Lime section from Culberson County to Shackelford County. This was based on well logs. There was such a demand for this issue that I was able to secure only one copy. Had a number of friends that wanted it. Only a few days ago one of the major company men told me they had this work photographed."

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Oklahoma-Kansas and Eastern Pipe Line Report

OKLAHOMA KANSAS

Pipe Line Statement for October

Runs

	Month	Dy. Av.
*Prairie Pipe Line Co.	4,650,000	150,000
Gulf Pipe Line Co.	1,529,539	49,340
Texas Pipe Line Co.	1,106,724	35,701
Magnolia Petroleum Co.	2,550,386	82,271
Empire Pipe Line Co.	1,473,318	47,526
Cosden Pipe Line Co.	1,138,647	36,731
Sinclair Pipe Line Co.	2,986,633	96,343
Oklahoma Pipe Line Co.	3,893,416	125,594
Other lines	8,401,000	271,000
Total October	27,729,663	894,506
Total September	27,436,777	914,558
Difference	292,886	20,052

Shipments

†Prairie Pipe Line Co.	5,156,292	166,332
Gulf Pipe Line Co.	1,291,657	38,763
Texas Pipe Line Co.	1,037,348	33,463
Magnolia Petroleum Co.	1,818,899	58,671
Empire Pipe Line Co.	1,561,078	50,357
Cosden Pipe Line Co.	1,020,709	32,926
†Sinclair Pipe Line Co.	2,743,407	88,497
Oklahoma P. L. Co.	3,838,711	123,829
Other lines	7,750,000	250,000
Total October	26,128,011	842,838
Total September	25,406,211	846,874
Difference	721,800	4,036

Stocks

*Prairie Oil & Gas Co.	30,800,000
*Prairie Pipe Line Co.	2,000,000
Gulf Pipe Line and Gypsy Oil Co.	9,850,890
The Texas Company	5,131,914
Magnolia Petroleum Co.	6,753,353
Empire Pipe Line Co.	4,482,898
Cosden Pipe Line Co.	3,328,315
*Sinclair Crude Oil Pur. Co.	20,250,000
Carter Oil Co.	16,103,950
Oklahoma P. L. Co.	2,717,330
*Other lines	10,000,000
Total October	111,418,650
Total September	109,566,085
Difference	1,852,565

*Estimated. †Prairie Pipe Line shipments include Texas crude and Sinclair Pipe Line shipments include Wyoming, Texas crude.

Note: Stocks do not include approximately 5,200,000 bbls. of crude oil held in storage on private tank farms and leases and approximately 1,800,000 bbls. of Texas Panhandle crude in storage in Oklahoma and Kansas.

EASTERN PIPE LINES

Runs From Wells

In the following table will be found the regular receipts from wells by various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for August and September:

	Aug. '27	Sept. '27
National Transit	146,479.36	148,770.19
S. W. Pa. P. L.	86,548.23	85,669.19
Eureka P. L.	395,237.23	386,201.76
Buckeye P. L. (Macksburg)	343,331.35	324,616.49
Buckeye P. L. (Cleveland)	11,953.23	11,430.57
Buckeye P. L. (Lima, etc.)	129,837.26	124,867.84
Indiana P. L.	8,905.59	9,150.58
Cumberland P. L.	267,515.04	245,038.71
N. Y. Transit	25,028.15	22,882.06
Tidewater P. L.	197,502.70	188,881.97
Pure Oil	164,866.70	159,336.57
Emery P. L.	59,569.14	57,479.57
Paragon Dev.	30,553.65	24,062.15
Pittsburgh P. L.	4,324.41	4,956.74
Stoll Oil Ref.	15,831.15	15,215.87
Total	1,886,983.19	1,808,560.83
Daily average	60,870.42	60,285.39

Note—Indian Refining Co. also reported other receipts of 375,293.93 bbls. Paragon Refining Co. had other receipts of 202,741.28 bbls. Paragon Development had other receipts of 24,753.46 bbls.

Petroleum Deliveries

The following tables exhibit the shipments or regular diliveries of various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for August and September:

	Aug. '27	Sept. '27
National Transit	344,799.78	352,363.94
S. W. Pa. P. L.	343,310.98	352,236.47
Eureka P. L.	198,755.14	181,601.67
Buckeye P. L. (Macksburg)	153,543.57	144,078.47
Buckeye P. L. (Cleveland)	727.43	971.43
Buckeye P. L. (Lima, etc.)	748,093.86	861,075.42
Indiana P. L.	868,709.30	840,001.40
Cumberland P. L.	150,233.42	141,790.84
N. Y. Transit	289,844.19	316,049.51
Northern P. L.	196,331.58	188,878.47
Tidewater P. L.	150,113.65	133,684.94
Pure Oil	205,913.45	176,414.97
Emery P. L.	54,657.91	59,433.76
Paragon Ref.	177,675.03	202,284.13
Indian Ref.	379,066.52	343,722.80
Paragon Dev.	31,192.30	26,388.83
Pittsburgh P. L.	5,395.27	5,410.13
Total	4,298,243.43	4,326,377.16
Daily average	138,653.01	144,212.57

Gross Stocks

The gross stocks held by various pipe lines in the oil producing sections of New York, Pennsylvania, West Virginia, Ohio, Indiana and Kentucky at the close of August and September:

	Aug. '27	Sept. '27
National Transit	1,129,180.77	1,154,733.90
S. W. Pa. P. L.	633,536.32	648,789.30
Eureke P. L.	1,949,935.99	1,803,065.25
Buckeye P. L. (Macksburg)	416,688.37	421,560.39
Buckeye P. L. (Cleveland)	39,918.38	50,809.14
Buckeye P. L. (Lima, etc.)	4,663,115.54	4,829,631.04
Indiana P. L.	620,873.22	621,233.99
Cumberland P. L.	591,843.81	614,472.24
Southern P. L.	429,471.58	466,091.05
N. Y. Transit	460,922.97	507,169.10
Northern P. L.	470,103.63	534,035.12
Pure Oil	395,429.71	400,850.33
Emery P. L.	13,506.50	12,401.24
Paragon Ref.	15,696.20	15,860.76
Indian Ref.	93,156.64	122,910.52
Paragon Dev.	6,821.39	6,145.06
Pittsburgh P. L.	3,864.26	2,978.00
Total	11,989,115.18	12,212,716.43
Increase	535,987.21	223,601.25

Grades of Oil

The following table shows the amount of the different grades of oil held by the eastern pipe lines at the close of August and September, showing the gross stocks of the above fields:

	Aug. '27	Sept. '27
Pennsylvania	4,238,474.19	4,235,065.02
Lima	1,018,062.71	1,078,066.53
Kentucky	1,134,629.10	1,144,347.96
Mid-Continent	5,531,964.28	5,691,414.41
Illinois	65,894.90	63,822.51
Total	11,989,115.18	12,212,716.43

Daily Average Runs

The following table shows the daily average runs of the Pennsylvania, Lima and Kentucky oil fields for the past four years:

	1924	1925	1926	1927
Jan.	62,638	56,831	55,630	56,209
Feb.	68,023	60,606	60,394	61,298
Mar.	68,721	60,575	61,644	63,247
April	71,055	63,062	63,019	60,337
May	63,942	59,217	60,580	60,284
June	63,230	61,270	64,131	62,757
July	64,208	62,639	63,206	58,574
Aug.	59,942	59,686	61,815	60,870
Sept.	62,930	62,510	64,639	60,285
Oct.	64,976	60,995	62,704	.....
Nov.	56,282	59,350	61,774	.....
Dec.	55,814	57,974	58,755	.....

Daily Average Shipments

The following table gives daily average shipments from the Pennsylvania, Lima and other fields for the past four years:

	1924	1925	1926	1927
Jan.	145,518	157,889	156,056	141,227
Feb.	148,732	160,863	159,488	138,534
Mar.	147,098	154,591	150,239	133,777
April	147,611	151,429	152,371	140,227
May	134,997	146,995	160,998	144,894
June	143,010	149,467	160,257	149,772
July	124,187	161,338	160,945	151,350
Aug.	123,120	161,730	151,929	138,653
Sept.	127,325	156,719	158,915	144,213
Oct.	123,170	145,388	161,132	.....
Nov.	124,400	143,582	152,668	.....
Dec.	151,392	150,162	136,428	.....

Gross Stocks

In the following table will be found the gross stocks of the various lines of the Pennsylvania, Lima and Kentucky oil fields, including oil received from other lines at the close of each month for the past three years:

	1925	1926	1927
Jan.	11,353,276	9,959,170	9,718,000
Feb.	11,192,924	9,579,354	10,119,162
Mar.	11,158,297	9,438,292	10,794,944
April	11,062,982	9,805,851	11,113,295
May	11,207,562	9,531,767	11,359,201
June	11,093,796	9,585,904	11,493,672
July	11,067,453	9,734,687	11,458,128
Aug.	10,974,481	9,668,947	11,989,115
Sept.	10,781,753	9,433,732	12,212,716
Oct.	11,086,850	9,269,806	.....
Nov.	11,068,158	9,257,667	.....
Dec.	10,458,445	9,464,513	.....

Franklin Pipe Line Co.

The following table exhibits the condition of the Franklin Pipe Line at the close of business for the months named and not counted in the stocks and averages reported above.

	Runs	Shipments	Stocks
1926—			
Sept.	2,788.18	3,373.06	13,985.61
Oct.	2,991.86	2,307.75	14,671.26
Nov.	2,810.60	1,664.55	15,817.31
Dec.	2,847.52	5,561.11	13,103.72
1927—			
Jan.	2,641.54	1,470.42	14,274.84
Feb.	2,764.30	1,082.82	15,956.31
Mar.	2,587.20	1,878.56	15,664.94
April	2,834.23	1,512.65	17,986.54
May	2,768.47	539.29	20,215.72
June	2,946.29	664.40	22,497.61
July	3,153.39	1,276.61	24,374.39
Aug.	3,057.89	8,713.11	18,719.17
Sept.	3,309.56	2,656.48	19,372.25

The Illinois Field

The following table gives the report of the Illinois Pipe Line Co. in Illinois:

Gross stocks, October 1	2,062,018.96
Other receipts	243,656.73
Runs from wells	599,000.13
Regular deliveries	405,432.76
Other deliveries	483,089.13

The amount of Illinois oil run by the Tidewater Pipe Co. in September was 24,580.36 bbls. and deliveries were 27,779.79 bbls. Adding these figures to those of the Illinois Pipe Line Co. makes the runs and deliveries as follows:

1926—	Runs	Deliveries
September	688,798.66	516,082.05
October	681,648.96	531,467.39
November	651,263.33	498,439.37
December	668,909.58	587,947.61
1927—		
January	621,421.03	530,085.91
February	595,831.16	476,950.71
March	727,593.91	554,947.43
April	593,226.97	444,818.49
May	728,759.40	543,192.02
June	640,975.85	532,217.74
July	613,901.30	484,901.53
August	651,276.40	529,331.37
September	619,589.49	423,312.49

Tidewater Pipe Co., Ltd., also delivered in September 218,229.09 bbls. of Oklahoma oil.

AVERAGE DAILY RECEIPTS OF CALIFORNIA OIL AT ATLANTIC AND GULF COAST PORTS

Average bbls. per day—	ATLANTIC PORTS						GULF COAST PORTS						Total All Ports
	Baltimore	Boston	New York	Philadelphia	Others	Total	Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total		
June	25,567	11,233	48,833	17,367	17,367	120,367	.....	.....	.....	.....	.....		120,367
July	13,484	17,290	33,065	9,129	5,451	78,419	.....	.....	.....	.....	968		79,387
August	18,516	3,065	48,129	17,323	26,000	113,032	.....	.....	.....	.....	.....		113,032
September	23,033	6,967	51,400	14,567	19,533	115,500	.....	.....	.....	.....	.....		115,500
October	20,936	4,355	47,968	14,129	14,387	101,774	.....	.....	.....	.....	.....		101,774

AVERAGE DAILY IMPORTS OF PETROLEUM AT PRINCIPAL UNITED STATES PORTS

Average bbls. per day—	ATLANTIC PORTS						GULF COAST PORTS						Total All Ports
	Baltimore	Boston	New York	Philadelphia	Others	Total	Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total		
June	18,167	9,700	83,867	10,900	16,567	139,200	2,000	31,800	.....	.....	33,800		173,000
July	22,226	10,387	80,193	7,193	38,710	158,710	3,226	25,065	806	.....	29,096		187,806
August	19,323	9,032	80,903	14,258	31,821	155,387	2,097	21,161	.....	.....	23,258		178,645
September	28,033	11,433	85,500	12,800	37,700	175,467	5,667	19,233	.....	3,600	28,500		203,967
October	26,064	13,097	79,355	3,838	34,097	156,451	1,613	19,323	806	1,871	23,613		180,064

GROSS PRODUCTION OF THE UNITED STATES FOR 12 MONTHS

(IN BARRELS)

		California	Oklahoma	Texas	Kansas	Arkansas	Louisiana	Rocky Mountains	Eastern Fields	Total
1926—										
November:	Month	19,173,128	16,876,950	18,593,160	3,593,490	4,299,480	2,054,911	2,842,587	3,216,000	70,649,706
	Daily average	639,104	562,565	619,772	119,783	143,316	68,497	94,752	107,200	2,354,990
December:	Month	20,276,950	17,882,908	19,753,591	3,854,156	4,266,189	2,018,734	2,658,301	3,313,000	73,823,829
	Daily average	654,095	576,868	637,212	117,876	137,619	65,120	85,752	106,871	2,381,414
1927—										
January:	Month	20,184,872	19,035,426	18,605,363	3,769,879	4,076,469	1,905,570	2,620,303	3,332,500	73,530,382
	Daily average	651,125	614,046	600,173	121,609	131,499	61,470	84,203	107,500	2,371,948
February	Month	17,982,711	19,752,348	16,483,712	3,352,076	3,574,256	1,784,104	2,385,135	3,007,200	68,321,542
	Daily average	642,240	705,441	588,704	119,717	127,652	63,718	85,183	107,400	2,440,057
March:	Month	19,835,724	22,480,921	18,232,617	3,675,143	3,853,920	2,032,982	2,476,798	3,335,800	75,923,905
	Daily average	639,862	725,191	588,149	118,553	124,320	65,580	79,574	105,100	2,449,158
April:	Month	19,493,825	22,208,136	17,801,140	3,516,930	3,378,240	1,994,330	2,615,770	3,474,000	74,482,365
	Daily average	648,870	740,271	593,371	117,231	112,608	66,491	87,193	115,800	2,482,745
May:	Month	19,506,054	23,258,463	19,539,083	3,704,314	3,493,669	1,935,175	2,742,588	3,467,000	77,646,346
	Daily average	629,238	750,273	630,293	119,494	112,699	62,425	88,471	111,839	2,504,721
June:	Month	19,181,442	22,830,330	18,299,810	3,437,580	3,365,760	1,880,820	2,592,437	3,330,000	75,018,179
	Daily average	639,381	761,011	613,327	114,586	112,192	62,694	86,414	111,000	2,500,606
July:	Month	19,319,021	26,522,546	17,607,194	3,454,082	3,406,683	2,279,405	2,635,607	3,373,000	78,597,538
	Daily average	623,194	855,566	567,974	111,422	109,893	73,529	85,020	198,806	2,535,491
August:	Month	19,279,131	26,283,350	17,715,229	3,424,570	3,242,600	2,199,905	2,530,065	3,608,400	78,283,250
	Daily average	621,907	847,850	571,459	110,470	104,600	70,964	81,615	116,400	2,525,266
September:	Month	19,064,500	24,111,666	18,322,800	3,342,240	3,032,970	2,027,070	2,238,609	3,465,000	75,604,845
	Daily average	635,483	803,722	610,760	111,408	101,099	67,569	74,620	115,500	2,516,825
October:	Month	19,448,893	24,223,803	19,203,136	3,509,169	3,117,300	2,056,159	2,270,905	3,565,000	77,394,365
	Daily average	627,384	781,413	619,456	113,199	100,555	66,339	73,255	115,000	2,496,601
	Total 12 months	232,746,251	265,467,435	220,256,815	42,433,629	43,107,536	24,169,165	30,609,065	40,486,500	899,276,396

PROGRESS

IN the field of *transportation* nothing indicates progress more clearly than the time required for a message to travel from New York to Boston: In 1789, by coach, 7 *days;* in 1927, by air mail, 9 *hours.*

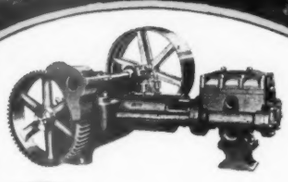
In the field of *oil-industry pumps*, nothing indicates progress more clearly than a comparison of present-day models with those in use before GASO entered the field.

GASO Pumps are unmatched for oil-industry service because they are designed exclusively for oil-industry use. The GASO organization lives in the heart of the industry; knows the conditions under which the pumps must operate; concentrates its energies on the fulfillment of oil-industry needs.

Our 64-page catalog will be mailed on request.

GASO PUMP & BURNER MFG. COMPANY

Tulsa, Okla.

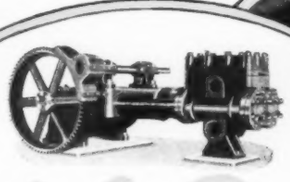


GASO GEAR-DRIVEN PUMPS

An Important Factor in Gaso Leadership

These pumps are carefully designed, strongly made and thoroughly inspected before shipment. No. 501 (at left) is a Horizontal Duplex Piston Pump designed for 200 to 800 lb. working pressure. It has large, direct, unobstructed fluid passages and valve areas.

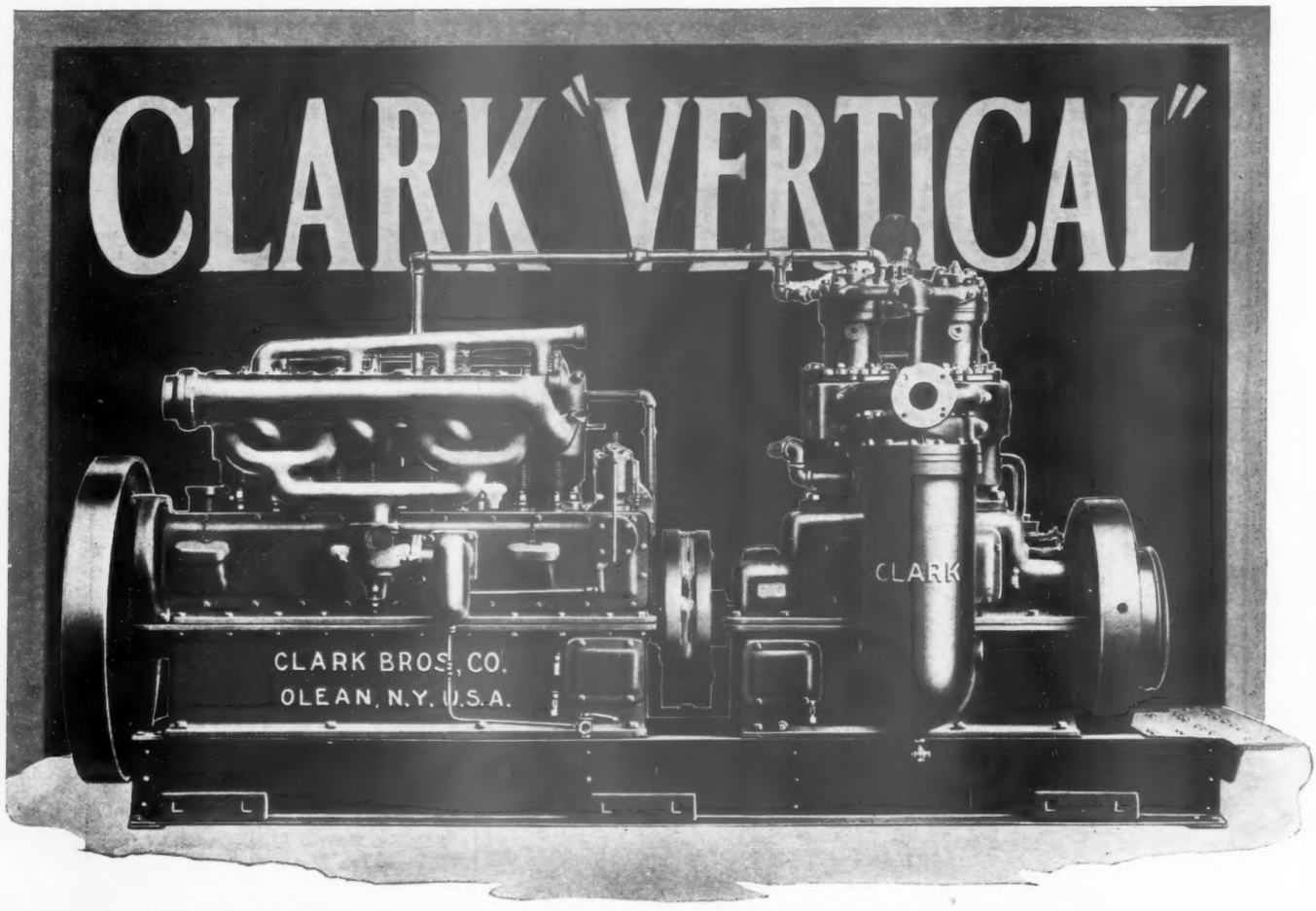
No. 508 (at right) is an inter-changeable liner type of Gaso Duplex Piston Pump. Quickly changeable from large-capacity, low-pressure service to small-capacity, high-pressure service. Has fewer but stronger parts.



GASO PUMPS

for every oil industry need

CLARK "VERTICAL"



FOR TEMPORARY AIR-LIFT PLANTS

or where speed of installation is a factor

For field air-lift plants that are substantial and efficient—yet *capable of being moved* with speed and minimum expense—the CLARK Vertical Semi-Portable Compressor provides the ideal unit. Mounted complete on one base, it can be set on timbers and placed in immediate operation.

PORTABILITY is highly desirable in field air-lift plants. The response of wells to air-lift may be of short duration. A portable plant can promptly be moved elsewhere.

SPEED OF INSTALLATION is another important need, as it is frequently advantageous to put wells on air-lift while they are properly headed.

CLARK Portables provide the ideal answer to these needs. These units are also entirely suited for permanent installations, though where permanent plants are planned the CLARK Tandem Compressor merits investigation.

Capacity of CLARK Vertical, 330,000 cu. ft. in 24 hours, at 400 lbs. discharge pressure. Gas Engine, 4-cylinder, Vertical, 75 H.P. Compressor: 2 vertical cylinders, each 2-stage.

Our engineers will gladly assist you with operating data and information. Clark Bros. Co., Olean, N. Y. Branch and Warehouse: 125 W. First St., Tulsa. Warehouses at McCamey and Sweetwater, Texas, and Artesia, N. M. California: Smith, Booth, Usher Co., 228 S. Central Av., Los Angeles, and 50 Fremont St., San Francisco.

CLARK